JOURNAL
OF THE
AMERICAN VETERINARY MEDICAL ASSOCIATION

In This Issue

Volume CXXI DECEMBER 1952 Number 909

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Journal of the American Veterinary Medical Association

CONTENTS

(Continued from Cover)

Surgery and Obstetrics

Clinical Data

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Friskies

Authoritative information on the scientific care and feeding of dogs. Published by Albers Milling Company (a division of Carnation Company) under the supervision of Dr. E. M. Gildow, B.S., M.S., D.V.M., Director of Research.

No. 17

DOG RESEARCH NEWS

Teething

The permanent incisors (front teeth) usually come in at about 5 to 6 months of age.

Diseases which involve a high fever or which alter the metabolic rate, such as distemper, may permanently disfigure the teeth with rings or pocks. Vaccinations with live viruses to produce a mild form of such a disease should be deferred until the permanent teeth are erupted.

Frequent inspection of the puppy's teeth enables the owner to detect troublesome tooth problems in the early stages.

Rickets from calcium and vitamin D deficiency, or excessive fluorine may also result in defective teeth. In this connection, it may be noted that a diet which provides vitamins and minerals in adequate quantities is of primary importance to the growing dog in order that he may develop sound bones and teeth.

One sure method open to the dog owner of providing such elements is to feed a reputable commercial dog food like Friskies Meal. Friskies has been tested on generations of dogs of all sizes and types. Since it contains every element dogs are known to need for complete nourishment, it provides the dog owner with a convenient, inexpensive diet for his dog which will go a long way toward promoting a strong, sturdy body and sound teeth.

Eye Injuries

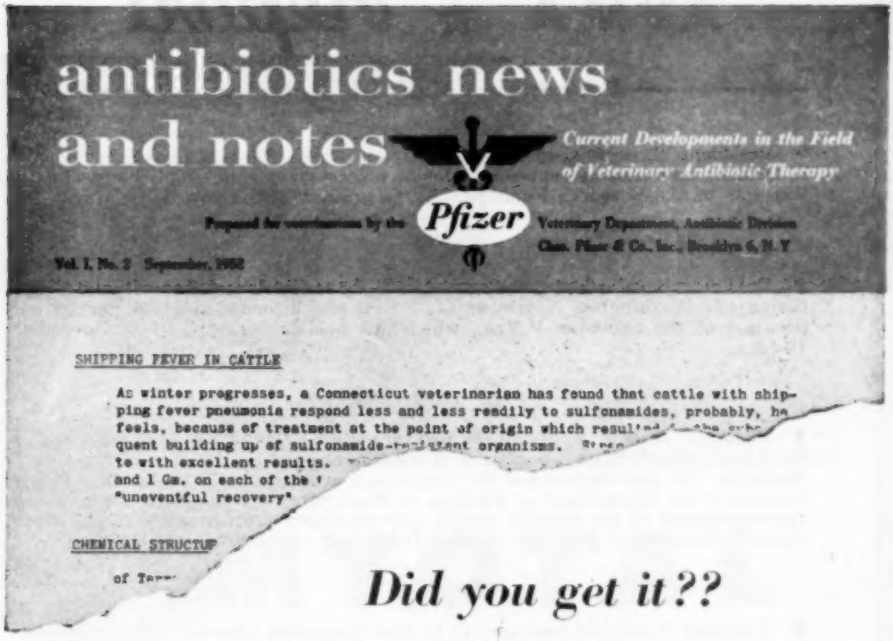
Eye injuries frequently result from toenail trauma, particularly if the dog has dew claws. Another condition, to which heavy faced dogs are more susceptible, is entropion, which is really a turned under eye lid.

Excessive lacrimation and some pus discharge may be associated with specific infectious diseases, though they may be caused by faulty housing or exposure to inclement weather.

Prompt attention to any eye injury, no matter how slight, safeguards the dog's vision.

In all eye injuries, the eye should be flushed out with a saturated solution of boric acid. If prompt recovery does not take place, the local veterinarian should be consulted at once.

HAVE A QUESTION? Write Friskies, Dept. Y, Los Angeles 36, California.



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AVMA ☆ Report

Veterinary Medical Activities

✦ President W. L. Boyd spent several days in Kansas City during the latter part of October interviewing representatives of several veterinary supply houses in the interests of the Research Fund Raising program which is now under way.

* * *

✦ President Boyd attended the annual meeting of the Association of Land Grant Colleges in Washington, November 11-13. He also attended and took part in the program of the Southern V.M.A., which was held in Jackson, Miss., November 17-19.

* * *

✦ President-Elect J. A. McCallam also represented the AVMA at the meeting of the Land Grant College Association in Washington and its Division of Veterinary Medicine. He also represented the Association at a meeting of the Medical Policy Council of the Department of Defense in Washington on November 24, to which representatives of the medical, dental, and veterinary professions were invited to discuss extension of P.L. 779 (Doctor Draft Law) or similar legislation.

* * *

✦ Assistant Executive Secretary C. D. Van Houweling attended the annual meeting of the Florida V.M.A. in West Palm Beach, October 26-28. On his return, he stopped at Louisville, Ky., for the annual meeting of the U. S. Livestock Sanitary Association, Oct. 29-31, 1952.

* * *

✦ Editor-in-Chief W. A. Aitken also attended the U.S.L.S.A. meeting in Louisville and represented the AVMA at a meeting of the National Committee on Eradication of Hog Cholera which was held prior to the other sessions.

* * *

✦ Drs. J. G. Hardenbergh and C. D. Van Houweling met in Toronto early in November with the officers and chairmen of the newly appointed Committee on Local Arrangements for the 1953 convention. This was an organization meeting at which the general plans for next year's convention were discussed.

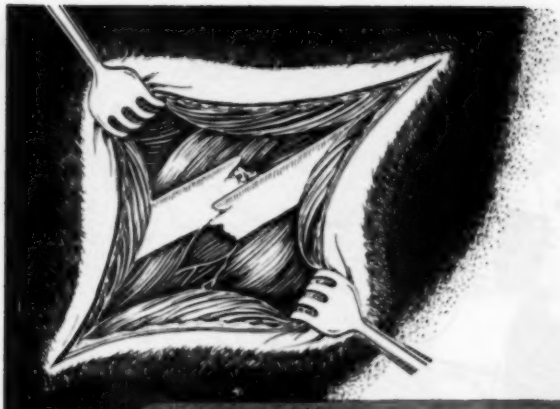
* * *

✦ Following are some of the meetings of AVMA bodies which were held at Association headquarters in Chicago in late November and early December:

November 22 — Council on Education
November 30 — Research Council
December 2 and 3 — Board of Governors
December 3 and 4 — Executive Board

* * *

✦ A group of about 25 officers of the Army and Air Force Veterinary Corps in attendance at the Meat and Dairy Hygiene School at the Chicago Quartermaster Depot visited the Association's headquarters on November 7. Members of the staff spoke to the group on the organization and activities of the AVMA and other professional matters.



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* *Reported by Dr. Fred J. Kingma at AVMA meeting, Milwaukee, 1951 (Proc. Book, AVMA, 1951, p. 178)*

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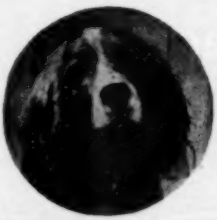

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[1]*Personal communication.*

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purified oxytocic principle

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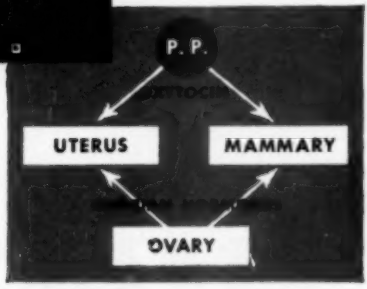

P.O.P. (Armour) is a sterile aqueous solution of highly purified oxytocic principle of the posterior pituitary gland obtained from domestic food animals.

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COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

Animal Care Panel. Annual meeting. University of Illinois, Chicago Professional Colleges, Chicago, Ill., Dec. 3-4, 1952. Bennett J. Cohen, Northwestern University Medical School, 303 E. Chicago Ave., Chicago 11, Ill., secretary.

Arizona Veterinary Medical Association. Annual meeting. San Marcos Hotel, Chandler, Ariz., Dec. 4-6, 1952. R. W. Adami, 2103 S. 6th Ave., Tucson, Ariz., secretary.

Maryland State Veterinary Medical Association. Annual winter meeting. Lord Baltimore Hotel, Baltimore, Md., Dec. 5-6, 1952. John D. Gadd, Cockeysville, Md., secretary.

Kentucky Veterinary Medical Association. Annual conference and short course. Animal Pathology Building, University of Kentucky, Lexington, Dec. 10-11, 1952. T. J. Stearns, Room 216, Livestock Exchange Bldg., Louisville, Ky., secretary.

University of Pennsylvania. Annual conference for veterinarians. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., Jan. 6-7, 1953.

Ohio State Veterinary Medical Association. Annual meeting. Deshler-Wallick Hotel, Columbus, Ohio, Jan. 7-9, 1953. F. J. Kingma, Veterinary Laboratory, The Ohio State University, Columbus 10, Ohio, secretary.

New York State Veterinary College. Annual conference for veterinarians. New York State Veterinary College, Cornell University, Ithaca, N. Y., Jan. 7-9, 1953. W. A. Hagan, dean.

Oklahoma Veterinary Medical Association. Annual meeting. Biltmore Hotel, Oklahoma City, Okla., Jan. 12-13, 1953. Lewis H. Moe, Oklahoma A. & M. College, Stillwater, Okla., secretary.

Tri-State (Mississippi, Arkansas, Tennessee) Veterinary Medical Association. Annual meeting. Hotel Peabody, Memphis, Tenn., Jan. 12-14, 1953. W. L. Thomas, 906 Broadway, Little Rock, Ark., chairman.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin, Indianapolis, Ind., Jan. 14-16, 1953. W. W. Garverick, Zionsville, Ind., secretary.

Ontario Veterinary Association. Annual meeting. Chateau Laurier Hotel, Ottawa, Ont., Jan. 14-16, 1953. R. V. L. Walker, 438 Piccadilly Ave., Ottawa, Ont., chairman.

Intermountain Veterinary Medical Association. Annual meeting. Newhouse Hotel, Salt Lake City, Utah, Jan. 19-21, 1953. H. F. Wilkins, Montana Livestock Sanitary Board, Helena, Mont., chairman, program committee.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Des Moines, Iowa, Jan. 20-22, 1953. E. B. Young, Waukee, Iowa, secretary.

Michigan State College. Annual postgraduate conference for veterinarians. Michigan State College, East Lansing, Mich., Jan. 21-22, 1953. G. R. Moore, Department of Surgery and Medicine, chairman.

Texas, State Veterinary Medical Association of. Annual meeting. Baker Hotel, Mineral Wells, Texas, Jan. 26-27, 1953. Al Price, 101 Veterinary Anatomy Building, College Station, Texas, executive secretary.

Minnesota State Veterinary Medical Society. Annual meeting. Nicollet Hotel, Minneapolis, Minn., Jan. 26-28, 1953. B. S. Pomeroy, St. Paul 1, Minn., secretary.

California State Veterinary Medical Association. Midwinter Annual meeting, Davis, Calif., Jan. 26-28, 1953. W. J. Zontine, 1014 Yucca Ave., Lancaster, Calif., program chairman.

North Carolina Veterinary Conference. North Carolina State College, Raleigh, N. Car., Jan. 27-29, 1953. C. D. Grinnells, North Carolina State College, Raleigh, chairman.

Illinois State Veterinary Medical Association. Annual meeting. Hotel Sherman, Chicago, Ill., Jan. 28-30, 1953. A. G. Misener, 6448 North Clark St., Chicago 26, Ill., secretary.

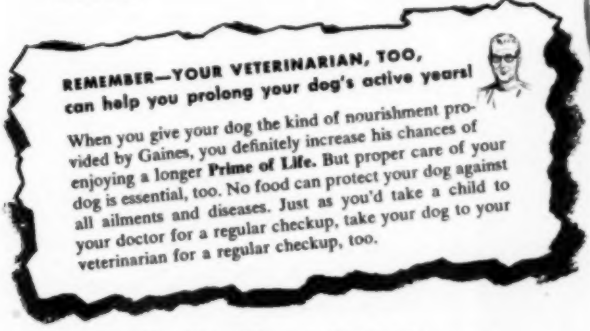
(Continued on p. 26)

PROTECTING HIS HEALTH THROUGH THE *Preventive* APPROACH

In modern Veterinary Medicine there is more and more emphasis on *preventive treatment* in protecting the health of dogs and increasing their longevity.

This same preventive approach applies in the field of dog nutrition, too. Haphazard table-scrap feeding and other unbalanced diets are being replaced with diets based on scientific principles of nutrition . . . protective, body-building diets that help promote and sustain vigorous health over the years.

A current advertising campaign on new Homogenized* GAINES Meal underscores both these facts. It features the health-protecting aspects of this completely balanced, uniformly nourishing dog food. And it offers millions of dog owners this important reminder:



* *Uniform Nourishment Guaranteed. Each and every granule contains uniform amounts of every food essential dogs are known to need. Developed by the Gaines Laboratories and tested at the famous Gaines Research Kennels.*

A Product of General Foods

Gaines *America's Largest-Selling Dog Food*
Now ***HOMOGENIZED!***

(COMING MEETINGS—*continued from p. 24*)

Louisiana State University. Annual conference for veterinarians. Louisiana State University, Baton Rouge, La., Feb. 3-4, 1952. W. T. Oglesby, head, Department of Veterinary Science.

Colorado A. & M. College. Annual conference for veterinarians. Colorado A. & M. College, Fort Collins, Colo., Feb. 16-18, 1953. O. R. Adams, director of veterinary clinics.

Missouri Veterinary Medical Association. Annual meeting. Hotel Jefferson, St. Louis, Mo., Feb. 23-24, 1953. J. L. Wells, P. O. Box 676, Kansas City, Mo., secretary.

American Veterinary Medical Association. Annual meeting. Royal York Hotel, Toronto, Ont., July 20-23, 1953. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association, the second Tuesday of each month. Richard L. Stowe, 149 Otsego Ave., San Francisco, Calif., secretary.

Cedar Valley Veterinary Association, the second Monday of each month (except July and August) at Black's Tea Room, Waterloo. F. E. Brutsman, Traer, Iowa, secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. W. E. Smith, 516 Oatman, Sanger, Calif., secretary.

Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. Mr. Earl D. Adams, Greensboro, N. Car., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

Coastal Bend Veterinary Association (Texas), the second Wednesday of each month. J. E. Hoban, 4301 S. Port Ave., Corpus Christi, Texas, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm

(*Continued on p. 28*)

(COMING MEETINGS — *continued from p. 26*)

Lake, Iowa. V. D. Ladwig, Sac City, Iowa, secretary.

Cuyahoga County (Cleveland, Ohio) Veterinary Medical Association, the first Wednesday of each month—September through May (except January)—at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Roger W. Grundish, 4217 Mayfield Road, South Euclid 21, Ohio, secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. Robert Clemens, 23352 Orchard, Hayward, Calif., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Florida, North-East Florida Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. J. O. Whiddon, 829 San Marco Blvd., Jacksonville, Fla.

Greater St. Louis Veterinary Medical Association. Ralston-Purina Research Building, St. Louis, Mo., the first Friday in February, April, June, and November. George A. Franz, 3667a Marceline Terrace, St. Louis, Mo., secretary.

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month. Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Sunday evening of even-numbered months at the Jefferson Hotel, Peoria, Ill. S. M. McCully, Lacon, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month, in Louisville or within a radius of 50 miles. E. M. Lang, 716 E. Broadway, Louisville, Ky., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at the Hotel Continental. T. M. Eagle, Parkville, Route 2, Mo., secretary.

(*Continued on p. 30*)

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a safe, single-dose treatment for milk fever

NEXT time the need for calcium is urgent, try VETRI-CAL, Abbott's new double salt, calcium gluconate-lactate solution.

VETRI-CAL provides prompt, trouble-free replacement therapy wherever a calcium deficiency occurs. You'll find it useful for *Milk Fever* (parturient paresis) and other hypocalcemic conditions of cattle, sheep, swine and horses.

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1. DeCoudres, William H., Sandy Lake, Pa.—communication to Abbott Laboratories.

(COMING MEETINGS — *Continued from p. 28*)

Kansas City Veterinary Medical Association, the third Tuesday of each month, in the Hotel Continental, 11th and Baltimore, Kansas City, Mo. K. M. Curts, 70 Central Ave., Kansas City 18, Kan., secretary.

Kern County Veterinary Medical Association, the first Thursday of each month. Richard A. Stiern, 17 Niles St., Bakersfield, Calif., secretary.

Keystone Veterinary Medical Association, the Philadelphia County Medical Society Building, 301 S. 21st Street, Philadelphia, Pa., on the fourth Wednesday of each month. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

Kyowva Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Karl Mayer, 1531 Fourth Ave., Huntington, W. Va., secretary.

Maricopa County Veterinary Association, the second Tuesday of each month. Charles J. Prchal, 1722 East Almeria Road, Phoenix, Ariz., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from September through May, at the Academy of Medicine of Northern New Jersey, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Millburn Ave., Maplewood, N. J., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at Hotel LaSalle, South Bend, Ind. Bruce Hostrawser, 2621 Mishawaka Ave., South Bend, Ind., secretary.

Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. C. Edward Taylor, 2146 S. Broad St., San Luis Obispo, Calif., secretary.

Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.

Mobile-Baldwin Veterinary Medical Association, the first Tuesday of each month at the Hotel Admiral Simmes, Mobile, Ala. C. Eric Kennedy, Mobile, Ala., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. C. Edward Taylor, 2146 South Broad St., San Luis Obispo, Calif., secretary.

New Castle County Veterinary Society, the second Wednesday of each month at 9:00

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Leptospirosis in Domestic Animals

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LEPTOSPIROSIS of man and animals has received increased attention in the last few years. This renewed interest arises, at least in part, from the finding that many domestic animals and rodents serve as reservoirs of infection, that there are many newly recognized species of Leptospira capable of infecting both man and animals, that the disease manifested by infected animals and man may be varied, and that several diseases heretofore considered to be of viral etiology are, in fact, the result of an infection with leptospiras.

An understanding of these diseases has been hampered by laxity in the use of proper diagnostic procedures and by the confusion which has existed in regard to the nomenclature of various strains or species of Leptospira which have been isolated in various parts of the world.

Veterinarians have a special interest in these diseases not only from the standpoint of the disease as manifested in animals but also from the fact that animals serve as the source of human infections. Physicians should be aware of the fact that leptospirosis in man depends on infection in animals and should have an appreciation of the factors contributing to the transmission from animals to man.

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With these thoughts in mind, an investigation was conducted in an attempt to determine the type and prevalence of leptospirosis in the animal population in the United States.

LITERATURE REVIEW

Bovine Leptospirosis.—Leptospira bovis,[5] *Leptospira pomona,*[3] and *Leptospira icterohaemorrhagiae*[12] have been isolated from cattle. In addition, Russian investigators have given the following names to the Leptospira which they have isolated from cattle: *Leptospira icterohaemoglobinuriae vitulorum,*[24] *Leptospira vitulina Sp. bovina,*[23] and *Leptospira icterohaemoglobinuria.*[10] The only information that could be found concerning the identity of these Russian strains were the reports by Nikolajeff[17] who considers *L. icterohaemoglobinuria* to be identical with *Leptospira grippotyphosa,* and that of Verge and Goret[10] who state that in all probability *L. icterohaemoglobinuria* is the same as *L. bovis.*

In addition to the above mentioned species, antibodies have been reported in cattle for *Leptospira mitis,*[20] *Leptospira sejroe,*[21] *Leptospira hyos,*[4] *Leptospira australis A,*[20] *Leptospira autumnalis,*[20] *Leptospira hebdomadis,*[20] and *L. grippotyphosa.*[23]

A rather high proportion of normal cattle carry antibodies for certain species of Leptospira. Bernkopf[5] reported that 8.5 per cent of 796 cattle serums tested in Palestine were positive for *L. bovis* at a serum dilution of 1:200. Savino and Rennella[47] found 55 of 300 cattle in Argentina serologically positive for *L. hyos.* Wikerhauser[49] reported that 50 of 300 cattle examined in Switzerland were serologically positive with *L. sejroe.* Bohl and Ferguson[7] and York[50] reported that a significant number of apparently normal cattle in the United States are serologically positive with *L. pomona.*

Swine Leptospirosis.—Leptospira icterohaemor-

rhagiae has been isolated from sick pigs by Klarenbeek and Winsser,[26] by Fields and Sellers,[12] and by Nisbett.[28] Gsell[17] found that as high as 13 per cent of normal swine in Switzerland have antibodies for this Leptospira.

Leptospira pomona has been isolated from the kidneys of normal swine by Mochtar,[25] Johnson,[29] and Savina and Rennella.[40, 41] Gochenour *et al.*[14] in the United States have recently reported the isolation of *L. pomona* from the urine of a sick pig originating from a herd where cholera existed. Guida[16] in Brazil isolated from swine a strain of Leptospira which was not completely identified by them but which was probably *L. pomona*. Based on serological tests, infection of swine with *L. pomona* has been reported from several countries with the prevalence in some cases rather high. Gsell[17] in Switzerland found 59 per cent of 193 normal swine to be positive; Savino and Rennella[41] in Argentina found 7 per cent of 73 swine positive; and Kolichine and Collombier[27] in France found 84 per cent of a herd of 51 swine positive.

Savino and Rennella[41] isolated from swine a Leptospira which they named *L. byos*, but which Babudieri[2] claims is serologicaly identical with *L. mitis*.

Bohl and Ferguson[7] in 1950 reported the finding of antibodies for *L. pomona* and *L. icterohaemorrhagiae* in a number of normal swine in Ohio. On one farm, they observed positive serological reactions for *L. pomona* among both cattle and swine which were pastured together, suggesting a possible transmission of this organism between these animals.

Equine Leptospirosis.—The Russian workers, Lubashenko and Novikova,[21] reported the isolation of a Leptospira from horses. They considered this Leptospira as being a "fox strain" which Nikolajeff[37] states has been designated "Far Eastern Strain B" (D V- V). Some of the infected horses were described as showing symptoms simulating infectious anemia. Roberts *et al.*[34] in New York State have recently reported the isolation of *L. pomona* from a horse affected with a septicemic disease.

The remainder of the information available on the type and prevalence of leptospirosis in horses has been limited to the results of serological investigations. Antibodies for *L. grippotyphosa*,[20, 42, 43] *L. pomona*,[42, 19] *Leptospira saxkoebing*,[40] *Leptospira canicola*,[42] *L. byos*,[42] *L. icterohaemorrhagiae*,[20, 47] *L. sejroe*,[20] and *L. australis*[20] have been reported in horses. There have been several reports on the unsuccessful attempts to isolate Leptospira from the kidneys of serologically positive horses.[40, 47]

Rimpau[33] and Heusser[19] reported the possible association of equine recurrent iridocyclitis with leptospirosis. Similar observations have been made in this country by Yager *et al.*[46] and Bohl and Ferguson.[7] Lukes and Cech[22] and Pokorny[31] consider Zdar (Schweinsberg) disease of horses the result of an infection with Leptospira, primarily *L. grippotyphosa*. This disease apparently has not been recognized in the United States.

Canine Leptospirosis.—There have been several recent reviews on canine leptospirosis.[36, 38] In the United States, *L. canicola*[23] and *L. icterohaemorrhagiae*[42] have been isolated from dogs. Typical of the serological investigations that have been made in dogs in the United States is that of Newman[30] who examined 500 dogs in the Detroit area and found 27 per cent positive with *L. canicola* and 2 per cent positive with *L. icterohaemorrhagiae*.

There is evidence that species of Leptospira other than *L. canicola* and *L. icterohaemorrhagiae* may infect dogs. Steigner[45] has reviewed the literature on this subject citing reports of infection with the following species: *L. pomona, Leptospira bataviae, L. grippotyphosa, L. hebdomadis, L. australis A, L. autumnalis, Leptospira javanica,* and *L. sejroe*.

The dog apparently serves as the primary reservoir only for *L. canicola*, and this species has been isolated only from the dog and man.

Leptospirosis in Rodents.—Leptospirosis among rodents is of considerable importance since many of these animals may act as carriers. Man and animals may thus become infected by contact with these animals or with their excreta. Knowledge of the species of rodents infected with Leptospira is of great importance in an understanding of the epidemiology of these diseases. Rats and mice appear to be of greatest importance as indicated in table 1 which gives some of the more common species of Leptospira and their host range.

TABLE 1—Some of the More Common Species of Leptospira and Their Host Range

Species	Primary animal host	Secondary animal host
L. icterohaemorrhagiae	Brown rat (Rattus norvegicus)	Man, swine, cattle, dog
L. canicola	Dog	Man
L. pomona	Swine, cattle	Man, dog, horse
L. autumnalis	Japanese field mice, Apodemus speciosus, Microtus montebelli	Man, cattle, dog
L. bovis	Cattle (?), rats (?)	Man
L. grippotyphosa	European mice, Microtus arvalis	Man, horse (?)
L. saxkoebing	Apodemus sylvaticus, Apodemus flavicolis	Man, horse (?)
L. bataviae	Brown rat Rattus norvegicus	Man, dog, cattle, swine

Good reviews on leptospirosis in mice and voles may be found in reports by Kathe[24] and Uhlenhuth.[44]

METHODS

The method of investigation consisted primarily of serological tests on animal serums, using as antigens some of the more common species of

Leptospira. The agglutination-lysis test, using viable Leptospira as antigens, was considered the serological test of choice. The antigens consisted of 5- to 10-day-old motile cultures of various species of Leptospira grown in a modified Schuffner's medium.[28]

The tests were performed by placing 0.1 ml. of a desired serum dilution and 0.1 ml. of a culture of Leptospira in a Kahn tube. The tubes were well shaken, covered with a moist towel to reduce evaporation, and then allowed to remain at room temperature for four to nine hours. Examination of the individual tubes for lysis or agglutination was then made by placing a loopful of the antigen-serum mixture on a slide and viewing by darkfield illumination at a magnification of 200. Evidence of agglutination and/or lysis as compared with the control was then sought. A serum dilution was considered positive when approximately one-half or more of the Leptospira were either lysed or agglutinated.

The origin of the species of Leptospira used in the serological tests were as follows:

L. canicola *L. icterohaemorrhagiae* *L. grippotyphosa* *L. mitis*	American Type Culture Collection
L. bovis Bauruch - 1 *L. pomona* NIH - 1 *L. autumnalis*	Army Medical Center
L. bataviae	Communicable Disease Center, Chamblee, Ga.
"N.Y.B." strain (American bovine strain)	K. R. Reinhard, New York State Veterinary College

By the use of adsorption tests and animal protection tests, *L. pomona* was found to be serologically identical with the "N.Y.B." strain. This agrees with the previous report by Gochenour *et al.*[18] in regard to the identity of the American bovine Leptospira. The strains of *L. mitis* and *L. bataviae* studied were also found to be serologically identical as determined by adsorption tests. The technique of the adsorption test used was essentially that described by Petersen.[29]

For the isolation of Leptospira, Chang's semisolid medium,[8] Schuffner's medium, and young guinea pigs were employed. The guinea pigs were bled from the heart on the occurrence of fever, which in the case of leptospirosis usually occurs from the third to the seventh day, and their blood was inoculated into the above mentioned mediums.

Fifteen- to 21-day-old hamsters were used in the animal protection tests for the determination of leptospiral antibodies. Animals of this age were found uniformly susceptible to virulent strains of *L. pomona*, *L. icterohaemorrhagiae*, and *L. canicola* with death occurring from the fourth to ninth day after injection. In the animal protection test, varying amounts of serum in question were inoculated subcutaneously into hamsters, followed in eighteen to twenty-four hours by an intraperitoneal injection of 0.3 ml. of a culture of Leptospira grown in Chang's semisolid medium.

RESULTS

Cattle.—The results of the serological examination of bovine serums collected at random are shown in table 2. Twelve of 352 serums were positive with *L. pomona*. Two of 152 serums were positive with *L. icterohaemorrhagiae*. No antibodies were detected for *L. canicola*, *L. grippotyphosa*, *L. bataviae*, *L. autumnalis*, or *L. bovis*.

The results of investigations of bovine and swine serum samples from several farms where bovine leptospirosis existed or was suspected are shown in table 3. Cattle and swine on these farms were maintained together.

Two out of 3 rats killed on farm 1 were found infected with *L. icterohaemorrhagiae*. Animal protection tests were performed on the serum of a cow from this farm showing a titer of 1:400 with *L. pomona*. Serum, 0.05 ml., gave protection to hamsters challenged with *L. pomona*. The same serum, 0.5 ml., afforded no protection to hamsters challenged with *L. icterohaemorrhagiae*.

Swine.—The results of the serological examination of swine serums collected at random are shown in table 4. The majority of these serum samples were collected at an abattoir and thus represent many herds. Ten of 280 serum samples were positive with *L. icterohaemorrhagiae* with the titers varying between 1:200 and 1:6400. Five samples were positive with *L. pomona*. No antibodies were found for *L. canicola*, *L. bataviae*, *L. grippotyphosa*, *L. bovis*, or *L. autumnalis*.

The results of the serological investigations of swine in contact with cattle infected with *L. pomona* are shown in table 3. It is evident that in such herds the percentage of infected swine may be high. Ninety-four head of swine from a serum company producing hog cholera antiserum were examined and 40 (43%) were serologically positive with *L. pomona*, while all were negative with *L. icterohaemorrhagiae*, *L. autumnalis*, and *L. bataviae*. A Leptospira was isolated from a kidney of 1 of these serologically positive pigs. By serological methods, this Leptospira was identified as *L. pomona*. All of these serologically positive swine from the various herds

appeared healthy. The serums from several of these swine had titers for *L. pomona* as high as 1:12,800. Using the animal protection test, 0.0005 ml. of serum from each of 2 of these pigs protected hamsters against a lethal dose of *L. pomona*, while 0.1 ml. of such serums afforded no protection to hamsters challenged with *L. icterohaemorrhagiae*.

Four different brands of hog cholera antiserum were examined for the presence of leptospiral antibodies by the agglutination-lysis test. Three out of the four were positive with *L. pomona* at a serum dilution of at least 1:100.

Horses.—Our results confirm the previous report of Yager *et al.*[38] in that a considerable number of horses in the United States have antibody titers for *L. pomona* with the incidence much higher in horses with recurrent iridocyclitis. Of 54 apparently normal horses, 13 were found to be serologically positive with *L. pomona* at a serum dilution of at least 1:300, while 1 was positive with *L. canicola*. No agglutinins were found for *L. grippotyphosa*, *L. bataviae*, *L. icterohaemorrhagiae*, or *L. bovis*. Of 11 horses with ocular lesions considered to be the result of recurrent iridocyclitis, 9 were positive with *L. pomona*. The kidneys of 10 horses serologically positive were collected and tissue suspensions were inoculated into Chang's semisolid mediums. In no case, however, was a Leptospira isolated.

Dogs.—Of 79 canine serums examined, 18 were positive with *L. canicola*, 7 with *L. icterohaemorrhagiae*, and none with *L. pomona*. A few of these animals were showing clinical signs of leptospirosis. Two stock dogs originating from farm 1 (table 3) were serologically negative for *L. pomona*, but 1 was positive for *L. icterohaemorrhagiae*. These 2 dogs had intimate contact with the farm animals, many of which apparently had been infected with *L. pomona*.

Murine Leptospirosis.—Thirty rats, *Rattus norvegicus*, were examined and 18 were considered infected with *L. icterohaemorrhagiae*. Of 24 rat serums examined, 14 (63%) were serologically positive with *L. icterohaemorrhagiae* at a serum dilution of 1:100, while all were negative with *L. pomona*, *L. canicola*, *L. bovis*, *L. bataviae*, and *L. grippotyphosa*. Leptospira were demonstrated either by cultural methods or by guinea pig inoculation from 11 of these 14 serologically positive rats.

The kidneys of 5 field mice, *Microtus pennsylvanicus pennsylvanicus*, were examined by darkfield and cultural methods but all were found negative for Leptospira.

DISCUSSION

There has been considerable confusion in regard to the proper nomenclature of certain species or strains of Leptospira. The isolation of what appears to be distinct species in widely separated parts of the world and the lack of facilities for their comparison has led to this confusion. There appears to be no doubt but that the American bovine strain of Leptospira is identical to *L. pomona* and should be so designated. It is probable that most, if not all, of the strains of Leptospira which have been designated *L. bataviae*, *L. mitis*, and *L. hyos* are identical. Esseveld[11] reported the similarity of *L. bataviae* and *L. mitis* and suggested that since the former is the older name it is the one which should be used. By adsorption tests, we found that the strains of *L. mitis* and *L. bataviae* studied were serologically identical. Babudieri[2] recently reported that *L. hyos* was serologically identical with *L. mitis*.

There are at least three species of Leptospira present in the animal population in the United States—*L. canicola*, *icterohaemorrhagiae*, and *L. pomona*. Evidence, mainly serological, was presented which indicates that the following animals are susceptible to natural infection with these Leptospira:

L. canicola	Dogs
L. icterohaemorrhagiae	Rats, swine, cattle, dogs
L. pomona	Swine, cattle, horses

From serological investigations there was no evidence that *L. bovis*, *L. bataviae*, *L. autumnalis*, or *L. grippotyphosa* are present in central Ohio. Although we could detect no evidence of animals infected with *L. autumnalis*, it is possible that this species may also be present in the animal population in the United States. Recently,[15] this organism has been found to be the cause of pretibial fever (Fort Bragg fever), which previously was considered to be a viral disease. In Japan where this disease (autumnal fever) was first reported,[28,22] field mice were determined to be the pri-

mary animal reservoir with cattle also becoming infected.[39]

The observation that a significant proportion of normal swine, cattle, and horses have antibodies for *L. pomona* suggests that this organism may at times be highly contagious but that most of the animals suffer only slight, if any, clinical signs. In cattle, a definite disease syndrome has been described.[2] Infection of horses with this organism has been associated with recurrent iridocyclitis, but definite proof of a causative relationship is lacking. Roberts *et al.*[44] reported an outbreak of leptospirosis occurring on a small horse breeding farm in New York. This disease was characterized by a high body temperature, depression or dullness, and anorexia. Icterus was observed in 2 of the 6 affected horses. The clinical signs manifested by swine infected with *L. pomona* appears to be rather obscure or indefinite at the present time.

Penso and Rosa[39] in Italy in 1938 associated a disease of young pigs with human cases of swineherd's disease. They reported that the disease in pigs would start with a slight intestinal disturbance and a rise in temperature which was often followed by clinical signs referable to a meningitis. These authors stated that they artificially reproduced the disease in pigs by the injection of "human virus." (The etiology of swineherd's disease at this time was considered to be a virus.) A few of the pigs died between the fourth and sixth day postinjection. They reported that the characteristic pathological lesions observed in this disease were punctiform hemorrhages in the intestine, larynx, renal pelvis, and brain. Although they admitted that the disease had some similarities to hog cholera, cross-immunization tests showed it to be a separate disease. Schmid and Giovanella[40] reported that the clinical signs shown by the artificial infection of swine with *L. pomona* were only slight and transitory and might be easily overlooked. However, localization of the Leptospira in the kidneys did result in the elimination of the organisms in the urine for several months.

It is of interest to note that antibodies for *L. pomona* were detected in three of four brands of commercial hog cholera antiserum. At this time, it is difficult to know what significance, if any, can be attached to this finding. Such positive serum, however, might give added protection to swine in the hog cholera-immunization process. It is conceivable that a concurrent infection with *L. pomona* at the time of hog cholera immunization could make such pigs more predisposed to a fatal attack by either hog cholera virus or *L. pomona*.

There appears to be an association between bovine and swine leptospirosis caused by *L. pomona*. Interspecies communicability is probably involved. This is suggested by the observation that on three farms investigated, both cattle and swine were serologically positive. On all three farms, the cattle and swine were in close contact. There is no substantial evidence that rats are infected with *L. pomona*.

The number of swine showing antibodies for *L. icterohaemorrhagiae* can probably be accounted for by the usual close association

TABLE 2—Serological Tests on Bovine Serums Collected at Random

Antigens	Positive animals*	No. of animals	Herds involved
L. icterohaemorrhagiae	2	152	66
L. canicola	0	135	64
L. pomona	12	352	130
L. autumnalis	0	118	33
L. grippotyphosa	0	167	60
L. bataviae	0	69	30
L. bovis	0	99	34

*At a serum dilution of at least 1:100.

TABLE 3—Results of Serological Tests with Leptospira Pomona on Farms where Bovine Leptospirosis Existed or Was Suspected

Farm	Cattle tested (No.)	Cattle positive* (No.)	Swine tested (No.)	Swine positive* (No.)
1	25	8	10	2
2	7	4	25	24
3	7	6	3	3
4	6	2	2	0
5	6	2	0	

*At a serum dilution of at least 1:100.

TABLE 4—Serological Tests on Swine Serums Collected at Random

Antigens	Positive* (No.)	Tested (No.)
L. icterohaemorrhagiae	10	280
L. canicola	0	210
L. pomona	5	280
L. autumnalis	0	80
L. grippotyphosa	0	210
L. bataviae	0	210
L. bovis	0	210

*At a serum dilution of at least 1:100

of rats and swine. Rats serving as carriers of *L. icterohaemorrhagiae* could easily be a source of infection for swine.

In parts of Europe, a large proportion of normal horses, swine, and cattle give positive serological reactions with *L. grippotyphosa* while only a few give positive reactions with *L. pomona*.[29] In contrast, in the United States a large proportion of normal horses, swine, and cattle give positive serological reactions with *L. pomona*, but so far we have yet to obtain among domestic animals a single positive reaction with *L. gripptoyphosa*.

On the continent of Europe, *L. grippotyphosa* is widespread and is found in the field mouse or vole, *Microtus arvalis*, which serves as the primary reservoir of this organism. Man, cattle, and horses apparently become infected from contact with the excreta of these infected voles. In the United States, *Microtus arvalis* does not exist, and there has been no evidence indicating the presence of *L. grippotyphosa*.

We believe that this information gives further evidence indicating the reliability and specificity of the agglutination-lysis test as a means of detecting previous exposure to Leptospira. One should keep in mind, though, that cross reactions among certain species of Leptospira may occur. If, however, sufficient species are used as antigens in the serological test, or if adsorption tests are used, then these cross reactions can be detected and properly evaluated. In this regard, it should be stated that Collier and Mochtar[9] regarded the complement-fixation test to be considerably inferior to the agglutination-lysis test in the serological diagnosis where infection could be due to one of several species of Leptospira.

There is considerable evidence to suggest that recurrent iridocyclitis of horses may be associated with, or caused by, an infection with Leptospira. Serological evidence in horses in this regard has already been presented. There have been many reports of human beings affected by an iridocyclitis following an attack of leptospirosis.[21,30,52,4] Characteristic of many such reports is the statement by Roch and Roch[45] that iridocyclitis is an important complication of swineherd's disease, manifesting itself many weeks or months after the recovery of the patient. They further stated that it is unforeseen and can declare itself in those cases where the sickness is inapparent or had not been diagnosed in its acute phase.

Assuming that equine recurrent iridocyclitis is associated with a leptospirosis, it is interesting to speculate on the probable method by which these organisms might produce such a condition. Dimock and his associates[10] have attempted to isolate organisms, including Leptospira, or to transmit the disease from an affected to a susceptible animal, but all attempts were negative. It is, therefore, probable that an etiological agent is not present in the eye during the ocular manifestations. However, it is conceivable that the ocular lesions could be the result of a local anaphylactic reaction. Leptospira, possibly by gaining entrance to the body by way of the ocular route, may sensitize or injure certain structures of the eye and thus act as an inciting cause in the production of an anaphylactic reaction which might occur considerably later.

All the species of Leptospira named in this report are capable of infecting man. Human beings apparently contract these diseases only by way of infected animals. Leptospirosis in man, especially that due to *L. pomona*, probably has not received sufficient attention from the medical profession in the United States.

SUMMARY

1) Serological evidence was presented to show that infection with *Leptospira pomona* is widespread among cattle, swine, and horses in Ohio.

2) No antibodies for *Leptospira grippotyphosa*, *Leptospira bovis*, *Leptospira autumnalis*, or *Leptospira bataviae* were detected in cattle, horses, or swine, suggesting that these species probably do not exist in Ohio.

3) *Leptospira pomona* was isolated from a kidney of a healthy pig.

4) Transmission of *L. pomona* from cattle to swine, or vice versa, probably occurs, as judged by the findings reported on several farms.

5) Although there was no evidence of illness, past or present, in the swine found to be serologically positive with *L. pomona*, consideration should be given to the possibility that under unfavorable circumstances or in conjunction with other infectious agents, this benign infection might be markedly altered.

6) *Leptospira pomona* appears to be

highly communicable to swine, as judged by the finding that 24 of 25 swine in one herd were serologically positive.

7) Equine recurrent iridocyclitis in the United States appears to be associated with an infection caused by *L. pomona* as judged by serological findings. A possible role by which Leptospira might initiate an iridiocyclitis is briefly discussed.

8) Antibodies for *L. pomona* were found in three out of four commercial brands of hog cholera antiserum. Mention is made of the possible significance of this observation.

References

[1]Babudieri, D.: La Leptospirosi 'pomonae' in Italia. Rend. Inst. Super. Sanita., *12,* (1949): 937-948. (Orig. not seen. Abstr. in Excerpta Medica, Sect. IV, *3,* (1950): 1251).

[2]Babudieri, D.: Posizione Sistemica di *Leptospira hyos,* Savina e Rennella. Bol. Soc. Ital. Biol. Sper., *27,* (1951): 104-105. (Orig. not seen. Abstr. in Exerpta Medica Sect. IV, *5,* (1952): 268).

[3]Baker, J. A., and Little, R. B.: Leptospirosis in Cattle. J. Exptl. Med., *88,* (1948): 295-306.

[4]Beeson, P. H., Hankey, D. D., and Cooper, C. F.: Leptospiral Iridocyclitis. J. Am. M. A., *145,* (1951): 229-230.

[5]Bernkopf, H.: Report on Bovine Leptospirosis in Palestine. Government of Palestine, Board for Scientific and Industrial Research, Jerusalem, 1948.

[6]Bernkopf, H., Olitzki, L., and Stuczynski, L. A.: Studies on Bovine and Human Leptospirosis. J. Infect. Dis. *80,* (1947): 53-63.

[7]Bohl, E. H., and Ferguson, L. C.: Report given at the meeting of "Research Workers in Animal Diseases in North America" at Chicago in November, 1950.

[8]Chang, Shih Lu: Culture Mediums for Leptospiras. J. Infect. Dis., *81,* (1947): 28-34.

[9]Collier, W. A., and Mochtar, A.: Die Komplementbindung bie der Diagnose der Leptospirosis in Niederlandisch Indien. Med. D. Volkesges., *28,* (1939): 356-372.

[10]Dimock, W. W., Bruner, D. W., and Edwards, P. R.: Periodic Ophthalmia of Horses and Mules. Kentucky Agric. Exper. Sta. Bull. 512, 1948.

[11]Esseveld, H.: Leptospirosis in Java and Sumatra. Proc. 4th Internat. Cong. on Trop. Med. and Malaria. Washington, 1948.

[12]Field, H. I., and Sellers, K. C.: *Leptospira Icterohaemorrhagiae* Infection in the Calf. Vet. Rec., *62,* (1950): 311-313.

[13]Field, H. I., and Sellers, K. C.: *Leptospira Icterohaemorrhagiae* Infection in Piglets. Vet. Rec., *63,* (1951): 78-81.

[14]Gochenour, W. S., Jr., Johnston, R. V., Yager, R. H., and Gochenour, W. S.: Porcine Leptospirosis. Am. J. Vet. Res., *13,* (1952): 158-160.

[15]Gochenour, W. S., Jr., Smadel, J. E., Jackson, E. B., Evans, L. B., and Yager, R. H.: Leptospiral Etiology of Fort Bragg Fever. Pub. Health Rep., *67,* (1952): 811-813.

[16]Gochenour, W. S., Jr., Yager, R. H., and Wetmore, P. W.: Antigenic Similarity of Bovine Strains of Leptospirae (United States) and *Leptospira pomona.* Proc. Soc. Exptl. Biol. and Med., *74,* (1950): 199-202.

[17]Gsell, O.: Leptospirosis Pomona, die Schweinehüterkrankheit. Schweiz. Med. Wchnschr., *76,* (1946): 237-241.

[18]Guida, V. O.: Sobre a Presenca de Leptospira em Suinos no Brasil. Arq. Inst. Biol., *18,* (1948): 285-287.

[19]Heusser, H.: Die Periodische Augenentzündung, ein Leptospirose? Schweiz. Arch. Tierheilk., *90,* (1948): 287-311.

[20]Johnson, D. W.: The Discovery of a Fifth Australian Type of Leptospirosis. Med. J. Australia, *1,* (1942): 431.

[21]Johnson, D. W.: The Australian Leptospiroses. Med. J. Australia, *2/20,* (1950): 724-731.

[22]Kaneko, K., Kotorii, S., and Aoki, Y.: Weitere Studien uber die "Hasamiyami". Ztschr. f. Hyg. u. Infektionskr., *117,* (1935): 202-207.

[23]Kathe, J.: Infektionen mit *Leptospira Grippotyphosa* bie Tieren und ihr Bedeutung fur die Epidemiologie des Schamm-Feldfiebers. Ztsch. f. Immunitätsforsch., *103,* (1943): 60-73.

[24]Kathe, J.: Die Epidemiologie der Leptospirenerkrankungen. Zentralbl. f. Bakt., Parasitenk. Abt. I, Orig., *155,* (1950): 199-226.

[25]Kelser, R. A., and Schoening, H. W.: Manual of Veterinary Bacteriology. 5th ed. The William and Wilkins Company, Baltimore, Md., (1948): 435.

[26]Klarenbeek, A., and Winsser, J.: Ein Fall von Spontaner Weilscher Krankheit bei Ferkeln. Deutsche Tierärztl. Wchnschr., *45,* (1937): 434-435.

[27]Kolochine-Erber, B., and Collombier, M.: Agglutination des Leptospires, en Particulier de *L. Pomona,* par les Serum de Porcs. Ann. Inst. Pasteur, *79,* (1950): 370-375.

[28]Koshina, K., Shiozawa, S., and Kitayama, K.: Studies on *Leptospira Hebdomadis.* J. Exptl. Med. *42,* (1925): 873-895.

[29]Krüger, A.: Vorkommen und Verbreitung der Leptospirosen bei den Haustieren. Berl. u. Münch. Tierärztl. Wchnschr., *65,* (1952): 121-124.

[30]Litzner, S., and Hahn, H.: Klinische Beobachtung bei einer Feldfieberepidemie. Deutsche Med. Wschnschr, *75,* (1950): 882-886. (Orig. not seen. Abstr. in Excerpta Medica Sect. IV, *4/1,* (1951): 37.)

[31]Lubashenko, S., and Novikova, L. S.: Symptoms, Diagnosis, Specific Prophylaxis and Therapy of Equine Leptospirosis (title trans.). Veterinariya, Moscow, *24/8,* (1947): 7-11.

[32]Lukes, J., and Cech, K.: Zdarska Nemoc v Jiznich Cechach. Casop. Ceskslov. Vet., *3,* (1948): 367-384.

[33]Meyer, K. F., Anderson-Stewart, B., and Eddie, B.: Canine Leptospirosis in the United States. J.A.V.M.A., *95,* (1939): 710-729.

[34]Mikhin, N. A., Azhinov, S. A., and Salikov: Morphological and Culture Characters and Virulence of *Leptospira Icterohaemoglobinuriae Vitulorum* (title trans.). Veterinariya, Moscow, *1,* (1941): 51-

52. (Orig. not seen. Abstr. in Vet. Bull., *12,* (1942): 531.)

[48]Mochtar, A.: Over het Voorkomen van Leptospiras bi j Varkens te Batavia. Geneesk. tijdschr. v. Nederl.-Indië, *80,* (1940): 2334-2339.

[49]Newman, J. P.: Studies of Canine Leptospirosis. Am. J. Vet. Res., *11,* (1950): 405-411.

[50]Nikolajeff, I. I.: Leptospirosis in the U. S. S. R. (title trans.). Med. Parasitol., Moscow, *15/4,* (1946): 65-75.

[51]Nisbett, D. I.: *Leptospira Icterohaemorrhagiae* Infection in Pigs. J. Comp. Path., *61,* (1951): 155-160.

[52]Penso, G., and Rosa, B.: Sull esistenza di una Particolare Affezione Morbosa die Suini da Virus della Malattia die Porcai. Profilassi, *11,* (1938): 53-62.

[53]Petersen, C. Borg: *L. Saxkoebing,* ein Neuer Serologischer Leptospiratyp. Acta. path. et microbiol. Scand., *21,* (1944): 165-180.

[54]Pokorny, B.: Serologicka Vysetrovani koni Stizenych Zdarskow Chorobou. Casop. Ceskoslov. Vet. *4,* (1949): 367-384.

[55]Randall, R., and Cooper, H.: The Golden Hamster (*Cricetus Auratus*) as a Test Animal for the Diagnosis of Leptospirosis. Science, *100,* (1944): 133-134.

[56]Rimpau, W.: Leptospirosen bei Pferden. Tierärztl. Umsch. *1,* (1947): 177. (Orig. not seen. Abstr. in Zentralbl. f. Bakt., Parasitenk, Abt. I, Ref., *146,* (1946): 228.)

[57]Roberts, S. J., York, C. J., and Robinson, J. W.: An Outbreak of Leptospirosis in Horses on a Small Farm. J.A.V.M.A. *121,* (1952): 237-242.

[58]Roch, M., and Roch, R.: La Maladie des Jenunes Porchers. Rev. Path. Comp., *49,* (1949): 417-427.

[59]Savino, E., and Rennella, E.: Leptospira en Cerdos de la Republica Argentina. Rev. d. Inst. bact., *13,* (1945/48): 65-71.

[60]Savino, E., and Rennella, E.: Leptospira en Animales Vacunos, Equinos y Lanares de la Republica Argentina. Rev. d. Inst. Bact. *13,* (1945/48): 72-76.

[61]Savino, E., and Rennella, E.: Posicion Sistematica de la Leptospira Suis. Su Identidad con le *Leptospira Pomona.* Rev. d. Inst. Bact., *14,* (1949): 267-269.

[62]Schmid, G., and Giovanella, R.: Uber die Schweinehüterkrankheit. Schweiz. Arch. f. Tierheilk., *89,* (1947): 1-13.

[63]Semskow, M. W.: The Cause, Clinical Forms, and Epizoötiology of Infectious Icterus in Cattle (title trans.). Z. Veterinark. *33,* (1949): [67]-23. (Orig. not seen. Abstr. in Vet. Bull., *'12,* (1942): 338).

[64]Steigner, K. Fr.: Serologische Untersuchungen über Hundeleptospirose in Gebiet von Hannover. Zentralbl. f. Bakt., Parasitenk., Abt. I Orig., *156,* (1950): 216-219.

[65]Steigner, K. Fr., and Messerschmidt, T.: Canicolafieber im Gebiet von Hannover. Ztschr. f. Immunitätsforsch., *108,* (1950): 37-62.

[66]Terskikh, V. I.: The Etiology of Infectious Icterus Among the Cattle: (title trans.). J. Microbiol., Moscow, *8,* (1940): 66-68. (Orig. not seen. Abstr. in Bull. Hyg., *16,* (1941): 335.)

[67]Uhlenhuth, P.: Die Maus als Leptospirentrager, Zugleich ein Beitrag zur Frage der Blutdifferenzierung Verschiedener Mausearten. Ztschr. f. Immunitätsforsch., *104,* (1943): 338-355.

[68]Uhlenhuth, P., Schoenherr, K. E., and Zimmerman, P.: Experimentelle Untersuchungen und Epidemiologische Beobachtung über die Leptospirose der Hunde. Ztschr. f. Immunitätsforsch., *108,* (1950): 1-36.

[69]Verge, J., and Goret, P.: La Leptospirose Icterohemoglobinurique des Bovides. Rev. Méd. Vét., *102,* (1951): 265-281.

[70]Wikerhauser, T.: Contribution a l'etude des Leptospiroses Bovine en Suisse. Thesis, University of Berne, 1950.

[71]Yager, R. H., Gochenour, W. S., Jr., and Wetmore, P. W.: Recurrent Iridocyclitis (Periodic Ophthalmia) of Horses. J.A.V.M.A., *117,* (1950): 207-209.

[72]Yamamoto, S.: De la Leptospirose chez les Animaux Domestiques. French text presented at the 19th Session of the Committee of the International Office of Epizoötics, May, 1951.

[73]York, C. J.: Aspects in Control of Bovine Leptospirosis. Proc. 55th Ann. Meeting U. S. Livestock A., (1951): 295-300.

Addendum.—Since submitting this paper for publication, three articles have come to our attention which appear to be pertinent. Heusser (*Schweiz. Arch. Tierheilk., 94,* (1952): 296-306) reported on the etiology of periodic ophthalmia in which he stated that acute iridocyclitis was artificially produced in 2 foals by the injection of *Leptospira pomona.* The incubation periods, from the time of the initial injection to the onset of acute iridocyclitis, were three and seven months respectively in the 2 foals. He stated that the experiment did not demonstrate any relationship between periodic ophthalmia and a deficiency of vitamin B_2. Hartwick and Stoebe (*Berl. u. Münch. Tierärztl. Wchnschr. 65/9,* (1952): 188-190 and *65/10,* (1952): 212-214) have reported the isolation of a Leptospira from the aqueous humor and blood of a horse affected with periodic ophthalmia. Ovine leptospirosis has been described by Hartley (*Austral. Vet. J., 28,* (1952): 169-170) in Australia. Icterus, hemoglobinuria, and anemia were observed in the affected sheep. The causative agent was considered to be *L. pomona.*

Dr. T. Childs Elected President of U. S. Livestock Sanitary Association

The Fifty-Sixth Annual Meeting of the United States Livestock Sanitary Association in Louisville, Ky., Oct. 29-31, 1952, was marked by an intense interest in the new disease problems confronting the livestock and poultry industries. The unusual occurrence of anthrax early in 1952, the more recent rapid spread of vesicular exanthema from California to 28 states, and the announcement of the sheep disease, scrapie (*see* p. 455), in California, the first time the disease has been diagnosed in the United States, gave real scientific interest to the entire meeting. There were also the usual discussions and reports on other major problems such as brucellosis, tuberculosis, and parasites. Methods of preventing the feeding of raw garbage to swine and the impetus that would give to the eradication of hog cholera were discussed.

The "revolt" of the beef cattle producers at the 1951 meeting (*see* Jan., 1952, JOURNAL, p. 6) was scarcely in evidence this year. Apparently, many did boycott the meeting; however, representatives from dairy cattle and swine breeders' organizations, as well as from the general farm organizations, were present. Little inclination to reconcile the difference of opinion in 1951 was evident.

The registration was large and the facilities for the meeting were fine, except that many registrants had difficulty getting occupancy of their hotel rooms. The local veterinary medical association (Jefferson County Veterinary Society) joined with Dr. L. L. Breeck and his staff in making the local arrangements, which included a tour for the ladies and a dinner and dance on the evening of October 30.

New officers include: president, Dr. T. Childs, Ottawa, Ont.; first vice-president, Dr. T. C. Green of West Virginia; second vice-president, Dr. I. G. Howe of New York; third vice-president, Dr. H. F. Wilkins of Montana, and the executive committee elected Dr. R. A. Hendershott of New Jersey to continue as secretary-treasurer. All of the above named officers, except Dr. Childs, are the chief livestock sanitary officials of their respective states. Dr. Childs is the veterinary director general of the Health of Animals Division of the Dominion Department of Agriculture and is from Ottawa, Ont.

Notes from U. S. Livestock Sanitary Association Meeting, Oct. 29-31, 1952

Rabies.—Most rabies cases in large animals are from wild animal sources. Cases start appearing in milk cows about six weeks after they are turned out in the spring and continue until six weeks after they are again stabled in the fall. Red fox mate in January and February; they break up and start migrating again in August. Most rabies is found in the species at those seasons. Canine rabies can be controlled by vaccination but in fox or other wild animals, it continues until the species is nearly decimated. Rabies is like a relay race, the "baton" has to be passed on, so if there is no receiver the disease stops. Hiring professional trappers helps eliminate the disease in wild animals.— *A. Zeissig, D.V.M., Rahway, N. J.*

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In one three-month period, Georgia had a $100,000 loss in cattle from rabies. No losses occurred in 600 cattle that were vaccinated. In Mexico, the new vaccine apparently protected 3,400 cattle. Rabies is spreading in vampire bats in Central America and Mexico and is approaching the United States border. The new hyperimmune rabies serum was used on 58 exposed persons in Georgia without fatalities. It is supposed to protect for ten to fifteen days but the supply is still too limited for use in other animals. The new chicken embryo vaccine seems to protect dogs for at least two years. —*L. E. Starr, D.V.M., Atlanta, Ga.*

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The brucellosis infection records of heifers vaccinated with "M" vaccine is somewhat better than unvaccinated controls but not as good as strain 19 vaccinates.—*J. Traum, D.V.M., Davis, Calif.*

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Garbage Feeding.—The control and eradication of trichinosis, vesicular exanthema, and foot-and-mouth disease depend on the elimination of raw garbage feeding and, to some extent, hog cholera is in the same category. At present, ½ of 1 per cent of garbage-fed livestock imperils the entire agricultural economy. From the standpoint of biological warfare, the civil defense authorities are greatly concerned.

Not only are Trichina larvae passed to new hosts through garbage but these larvae may be the intermediate hosts for disease viruses. The lymphocytic choriomeningitis virus has been transferred from guinea pig to guinea pig, with lethal results, through Trichina larvae. Likewise, as proved years ago, the swine lung worm serves as an intermediate host for swine influenza virus. Another

swine nematode likewise is believed to be a host for a third virus.

The last two epizoötics of foot-and-mouth disease, in 1924 and 1929, originated from raw garbage feeding. This virus has been very resistant at times. Therefore, the use of uncooked garbage even as fertilizer may be dangerous.—*R. E. Shope, M.D., D.V.M., Oscar Sussman, D.V.M., R. A. Hendershott, D.V.M.*

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Resolution Adopted Calling for Garbage Cooking.—The Committee on Resolutions presented a resolution (1) condemning the feeding of raw garbage, (2) calling for all states to require garbage cooking, (3) urging the Secretary of Agriculture and the Bureau of Animal Industry to prohibit the interstate shipment of raw garbage, and of hogs fed raw garbage, and the slaughtering of such hogs in federally inspected establishments.

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Hog Cholera Control in Canada.—In 1903, before commercial hog cholera virus appeared, Canadian authorities sought laws to prohibit the feeding of uncooked garbage to hogs. Such laws were procured in 1916. With commercial virus also prohibited, cholera was eradicated by the quarantine and slaughter method. The last outbreak, except in newly acquired New Foundland, was in 1947 when 44 hogs were slaughtered. All garbage feeders are licensed. They are required to install garbage-cooking equipment, to boil all garbage before feeding it to hogs, to keep their yards sanitary, and to sell hogs only for slaughter.

Canada's 631 licensed garbage feeders are inspected, unannounced, once per month. Garbage from ships and trains can be unloaded only at certain places where it is disposed of under supervision.—*Orlan Hall, D.V.M., Ottawa, Ont.*

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Tuberculosis.—The intradermal, cervical tuberculin test is being used in 18 states on herds which maintain infection. With reduced exposure to the disease, animals probably become more susceptible. Over 1,000 cattle were condemned and tanked in 1951. Meat inspection has disclosed as many infected herds as testing has.—*A. K. Kuttler, D.V.M., Washington, D. C.*

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When tuberculosis is found in the Chicago packing plants the origin of the animal can be traced in less than 50 per cent of cases.—*J. R. Pickard, D.V.M., Chicago, Ill.*

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Morbidity Reporting of Animal Diseases.—Real progress has been made in the development of an animal morbidity- and mortality-reporting service. The Bureau of the Budget has recognized the need for this service, and representatives of the U. S. Department of Agriculture, the Bureau of Animal Industry, the U. S. Public Health Service, and the Federal Civil Defense Administration have agreed upon the fundamental principles of the program. A pilot program conducted recently in Indiana will be expanded to include several states in 1953.

The contemplated program would envisage the following fundamentals: (1) a veterinarian on the state health department staff; (2) close liaison with the state livestock sanitary official; (3) approval of the state veterinary medical association; (4) a complete program outline before it is initiated; (5) reports followed by investigations; (6) periodic checking of reports; and (7) that animal disease control must be a function of the state livestock disease control agency.—*L. Otis Emik, Ph.D., Atlanta, Ga.*

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Air Sac Infection in Chickens.—An air sac infection, etiologically related but distinct from infectious bronchitis and Newcastle disease, causing mortalities as high as 50 per cent, was described. The disease was credited with causing the death of 10 million chickens in the Del-Mar-Va area. Chickens that are immune to infectious bronchitis and Newcastle disease commonly contract the disease. It is hard, if not impossible, to distinguish it clinically from other respiratory infections. The etiology of the entire syndrome as seen in the field is probably not known. The true value of treatments are hard to assess on a flock basis.—*E. L. Jungherr, D.V.M., Storrs, Conn.*

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Life Cycle of Lancet Liver Fluke.—The lancet liver fluke, *Dicrocoelium dendriticum*, which has been recognized in cattle, sheep, deer, woodchuck, and rabbits in New York is now known to involve land snails and ants in its life cycle. First seen in 1940, this fluke spread to six counties by 1943 and is still spreading but has not been identified outside of New York. It is small, transparent, and relatively nonpathogenic in cattle but is more so in sheep. The fluke eggs are passed in feces, then picked up by land snails. The snails produce slime balls which infect ants. The ants crawl up on grass and are consumed by the host, thus completing the life cycle.—*Donald W. Baker, D.V.M., Ithaca, N. Y.*

An all time high of $43,500 was paid for a Polled Hereford bull at an Otis, Kan., sale recently. The top 25 animals in this sale averaged $4,176. At a Garden City, Kan., sale another Hereford bull sold for $33,100 and the top 50 head averaged $4,863. At a Vaughn, Mont., sale the top Hereford bull sold for $35,700 and the average for the top 50 animals was $4,975.—*Am. Hereford J., Oct. 1 and Dec. 15, 1952.*

A 77-lb. fleece was sheared from a wether that had roamed Unalaska Island for about five years without being sheared. The wool staple averaged between 16 and 18 inches in length.—*Country Gentleman, Oct., 1952.*

The Herzberger Veterinary Hospital

ARTHUR C. HERZBERGER, D.V.M.

Colorado Springs, Colorado

When I returned from Army Service to Colorado Springs in December, 1945, I started a large animal practice, treating only the few small animals that I could see at night in the basement of our home. In about a year, it became obvious that I was going to need more and better facilities for both large and small animals. After two years, I was able to purchase 35 lots at the eastern edge of the city on a main highway. The zoning board allowed me to have the alley vacated so that I could combine the ground into one piece of about 5 acres, 4 of which are fenced pasture.

In April, 1948, my hospital was built. In June, 1949, I was fortunate enough to have Dr. R. C. Walker join me in practice.

In planning the hospital, I separated the examination room from the waiting room by putting the drug and x-ray rooms in between. This helps to keep any undesirable noises from the patients and owners in the reception room. There is a window for dispensing drugs directly from the drug room into the waiting room.

The kennels, which accommodate 42 dogs and cats at the present time, are at one end of the hospital and the living quarters are at the other. A couple lives at the hospital the year around. The man is one of the attendants and the woman acts as receptionist, bookkeeper, and assistant in surgery. We have another male attendant who comes in daily.

The hospital is built of cinder block covered with white stucco. The windows and trim are in turquoise. The walls and doors are all white except for the examination room and the public lavatory, which are in pastels. The floors, except in the kennels, are of concrete covered with asphalt tile. In the kennels, we have found the plain cement floors, painted, easier to keep. The kennel floors are concrete and slope slightly to the front where they drain into a gutter. The gutter, in turn, drains into a trap in the floor at the far end of the kennels. The upper gutter drains by means of a copper pipe, and the lower gutter drains directly into the trap.

Kennel doors are made of pipe frames with expanded metal welded into the frames. The kennel floors, both for upper and lower decks, are heated by radiant heat. There is also a radiator in each kennel room for use in extremely cold weather. The remainder of the hospital is heated by radiators of the circulating hot water type. The plumbing and heating in the hospital

Fig. 1—The Herzberger Veterinary Medical Hospital.

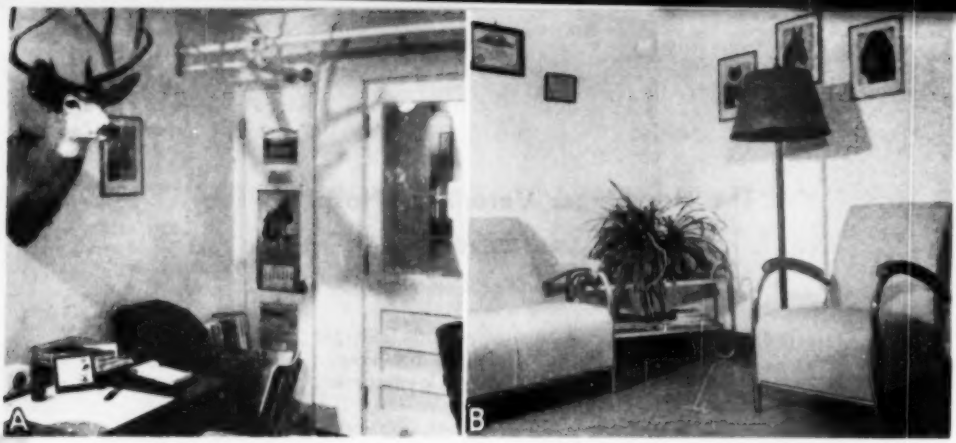


Fig. 2—(A) A view of the office taken from the hallway showing the door to the back of the hospital through which can be seen the entire large animal hospital. (B) A corner of the reception room.

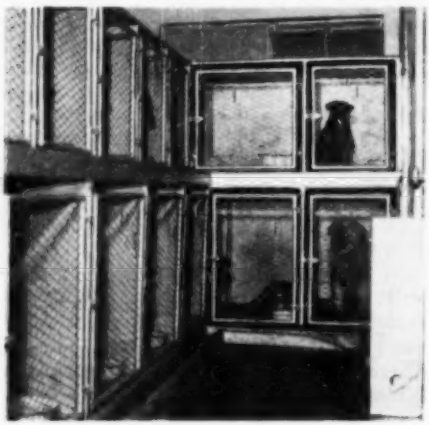


Fig. 3—The kennel room in the small animal hospital.

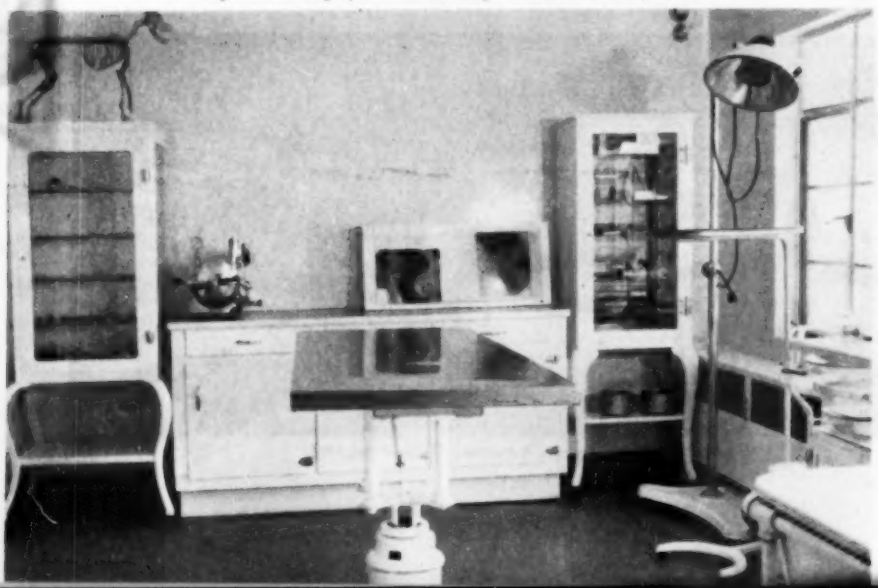
cost about $6,000 and have been extremely satisfactory.

In each kennel room I have installed the General Electric disinfectaire lights. These have helped a lot in controlling odors. We also think they help to keep down respiratory infections, such as "kennel coughs."

The x-ray machine is an Army semi-portable 30 Ma. (Picker). Since the x-ray room is an inside room, we use it also as a darkroom.

The large animal part of the hospital, accommodating approximately 20 animals, is entirely apart from the small animal building. A driveway separates the two

Fig. 4—The surgery of the Herzberger small animal hospital.



sections. The original large animal buildings are of frame construction. The barn, 24 by 40 ft., which has been added recently, is of pumice block. It is suitable for conversion as necessary—garage or hay storage.

We have found the whole arrangement efficient and satisfactory.

The large animal territory we serve is extensive and not heavily populated. We travel up to 75 mi. in an easterly and westerly direction, and 25 mi. to the north and south. Our large animal hospital has been very beneficial both to us and to our clients. During the winter, our large animal facilities are overcrowded even yet. We have a large number of patients come in daily to be treated for such ailments as lumpy jaw,

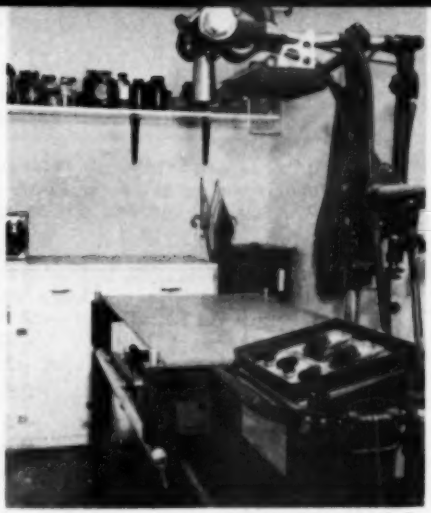
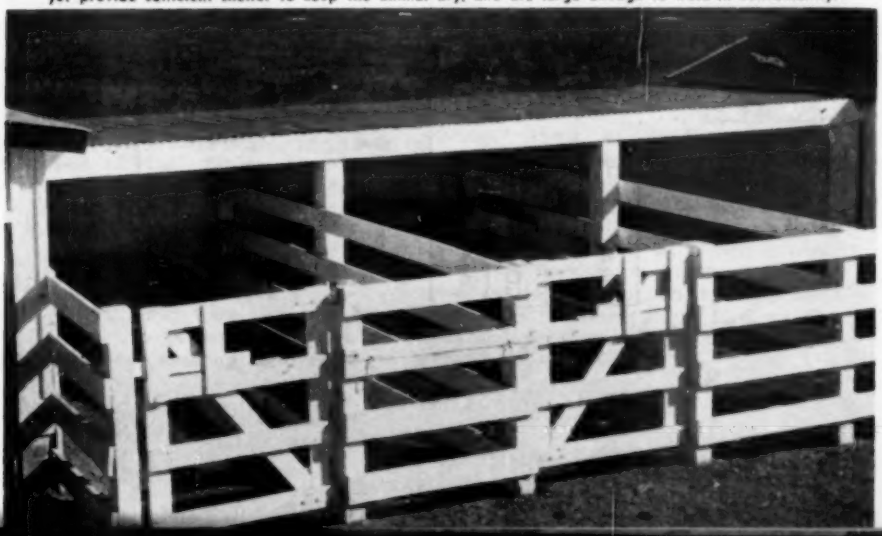


Fig. 5—The x-ray room. Dr. Herzberger and Dr. Walker are proud of the x-ray machine. The developing tank is shown below with a lead-lined cabinet for storage of films.

Fig. 6—The large animal section of the Herzberger hospital.

Fig. 7—Three of the stalls in the large animal section, beyond which is a 4-acre fenced pasture. The stalls are large enough to give the animal more than usual freedom; they allow more sun and yet provide sufficient shelter to keep the animal dry, and are large enough to work in conveniently.



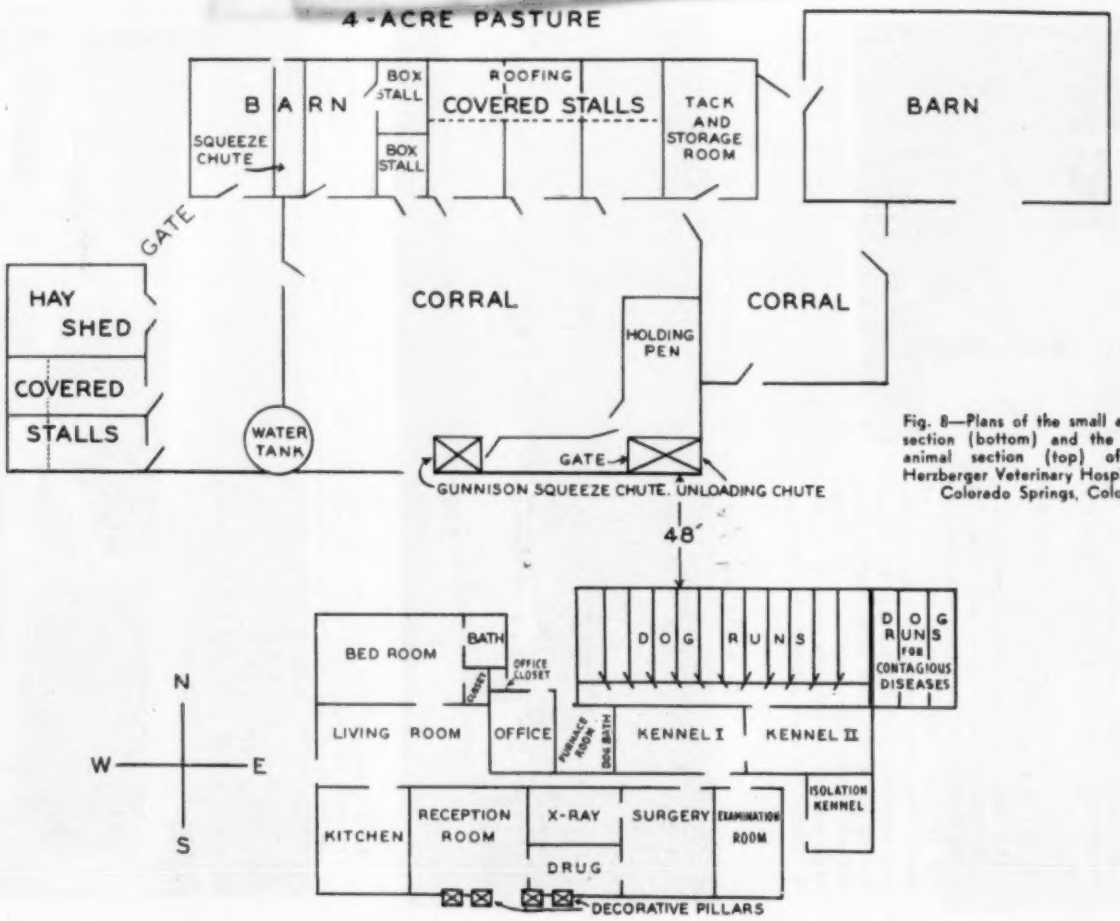


Fig. 8—Plans of the small animal section (bottom) and the large animal section (top) of the Herzberger Veterinary Hospital in Colorado Springs, Colo.

woody tongue, traumatic gastritis, dystocia, impactions, foot rot, urinary calculi, brisket disease, mastitis, milk fever, and the like. A number of these cases is sent home the same day but the pneumonia and diphtheria cases and those which call for rumenotomies are kept for treatment.

Preserving Leptospira in Urine

Urine from 2 calves naturally infected with Leptospira was divided into six jars. Formalin was added to one pair of jars to make a 0.2 per cent solution, to another pair to make a 0.5 per cent solution, and a third pair served as controls. One of each pair was incubated at 37 C., the other was kept at room temperature. After five days, the morphology of the Leptospira was not appreciably changed in the 0.5 per cent formalin solution. The Leptospira could be recognized, but with difficulty, in the 0.2 per cent solution. No Leptospira could be identified in the controls by the third day.—*Vet. Bull., Aug., 1952*:

[The above information might be of value in preserving specimens from living suspected cases.—ED.]

Leptospira may be the cause of some cases of so-called ictero-anemia in swine but probably not the cases which have an enlargement of the spleen.—*J. D. Ray, D.V.M., White Hall, Ill.*

In 1950, leptospirosis was diagnosed in a herd of 50 cows. Nearly all showed some clinical symptoms and 10 aborted but only 2 died. No clinical cases have appeared since then. A serological test of the herd in 1952 showed two thirds of them positive.—*W. G. Raudabaugh, D.V.M., Piper City, Ill.*

Many ewes on a farm where there was leptospirosis aborted. Several were positive later to an agglutination-lysis test.—*P. D. Beamer, D.V.M., University of Illinois, Urbana.*

Many cows in a herd affected with leptospirosis in July, 1950, were replaced. Several of the new cows later contracted the disease but there were no recurrences in those that were previously sick. Apparently an attack must confer some immunity.—*M. Erdheim, D.V.M., Grayslake, Ill.*

In a herd of 35 brucellosis-negative sows many aborted; only 85 pigs were saved. Ten sows were tested for leptospirosis; all reacted. All that were rebred later farrowed good litters.—*M. E. Boyer, D.V.M., Freeport, Ill.*

Two swine herdsmen on the same establishment in France contracted *Leptospira pomona* infection (*Bull. Acad. Méd., 134*, 1950. Serological tests showed that 34 of 47 pigs on the place had an agglutination titer of over 1 : 1,000.—*Vet. Bull., July, 1952.*

Leptospirosis was diagnosed in a veterinary student at a midwestern college recently. As he is not yet enrolled in clinics, physicians were puzzled until it was suggested that he might have been exposed while working in a stockyard last summer. Leptospira (type not yet identified) were found in his urine and he reacted to serological tests. His dog, which was ill three weeks earlier, has also reacted positively. The lad seems to be improving.—W. A. A.

Chickens Handled as Commodities

The American Humane Association is broadening its scope of interests. *The National Humane Review* (Sept., 1952) states that there are about 30 million dogs in the United States and about the same number of cats, but there are probably 4 billion other domestic animals and fowl and tens of billions of wild animals. The *Review* believes that cruelties to dogs and cats seldom equal inhumane treatment of other animals. About 2 billion chickens are hatched annually but only about 1 billion ever reach the broiler or laying stage. Because of mass production methods they are treated more as commodities than as living animals. Some raised in batteries never know what freedom or even room for free movement is. One opinion is that a hen's concern "is not freedom but food, ventilation, and room enough to cackle." Who knows?

The Use of Antibiotics in the Treatment of Low Fertility Cows

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APPROXIMATELY 40 per cent of the cows bred artificially return for rebreeding after first service. A majority of these cows have fairly normal estrous cycles with no abnormalities of the genital organs detectable by palpation. Many will conceive if bred a sufficient number of times, but the failure of cows to settle when bred results in a very important loss to the dairy industry due to extended service periods. Chapman and Casida[6] calculated that butterfat production for a twelve-month calving interval averaged 341 lb., whereas, for a thirteen-month calving interval it averaged only 6 lb. more or 347 lb.

The failure of the early embryo to survive has been observed as a cause for clinically normal cows to return for a rebreeding.[10] The death of the embryo occurs sometime during the first month of gestation.

A low-grade infection in the genital tract could be one possible cause of infertility. Hatch *et al.*[9] report the presence of bacterial infection in the cervix and vagina of infertile cows. Also, a higher percentage of the genital tracts of cows classified as repeat-breeders contained some infection than did cows with a normal breeding history.[7] Other workers have also reported the presence of bacteria and infection of the reproductive organs as a cause of infertility in cattle.[5,10]

Chambers[5] suggests that cows which are apparently normal and which come in heat regularly but do not conceive after several breedings will settle in 90 percent or more of the cases following infusion of the uterus with penicillin. The infusion of the uterus with antibiotics has also been reported as a successful treatment against specific bacteria, such as *Vibrio fetus*.[5]

The beneficial effects of antibiotics in bovine sterility have been further substantiated by their use in bull semen dilutor.[1,10]

This report is one in a series dealing with the treatments for infertility in clinically normal cows. The present study was designed to determine in a controlled experiment the effect of a combination of antibiotics as a treatment for repeat-breeder cows.

MATERIALS AND METHODS

A total of 57 cows was obtained for study during the period from Dec. 27, 1950, to Feb. 5, 1952, and included 37 Holstein-Friesians and 20 Guernseys. Classification by breed was made according to color markings. Only a few animals became available at any one time, as they came from farms located in 17 Wisconsin and two Illinois counties, which were being served by four different artificial breeding organizations. The technicians working for these organizations made the preliminary selection of these animals. The cows were then examined further and final selection on the farm was made by one of the authors. The animals had to meet the following specifications: (1) a minimum of four infertile services since last calving with a heat period since last breeding; (2) a minimum of one calving, but not over ten years of age; (3) not more than 2 experimental cows from any one farm; and (4) show no visual evidence of infection such as a purulent discharge or other abnormalities detected upon manual palpation *per rectum*. Briefly, no cows were used where a condition was detected which would indicate

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From the Department of Genetics: Ulberg and Black (also agents of the Bureau of Dairy Industry, U.S.D.A.), Kidder and Casida; Department of Veterinary Science: McDonald (research fellow of the American Veterinary Medical Association), and McNutt.

This work was also supported in part by grants from Badger Breeders' Coöperative, Shawano, Wis., and Wisconsin Scientific Breeding Institute, Madison, Wis.

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The following organizations located experimental animals for this study: Badger Breeders' Coöperative, Shawano, Wis.; Southern Wisconsin Breeders' Coöperative, Madison, Wis.; Tri-State Breeders' Coöperative, Westby, Wis.; Wisconsin Scientific Breeding Institute, Madison, Wis.

treatment or which obviously might prevent conception.

The cows were purchased and assembled in a run-type barn located at the Agricultural Experiment Station. All cows were placed in milking stalls twice daily where they were given an average dairy ration of concentrate. None of the cows were on high milk production, many were not producing at all. However, all animals which were producing when purchased were continued in production. During the later part of this study, calves were allowed to run with the cows as a method of disposing of the milk. Medium quality alfalfa hay was fed throughout the study. Grass silage was fed when available.

Alternate cows (within the breed) to show estrous behavior after entering the experimental barn were assigned to treatment and the remainder served as controls. Heat checks were made twice daily, and a cow was considered in heat when she would stand to be mounted by an ovariectomized heifer which had been treated with an estrogen. Inseminations were always made on the second heat check after the cow was first noticed in heat. Approximately 1.0 ml. of semen, as used in the field, was placed just through the cervix, into the lumen of the uterine body.* Routine palpations were made *per rectum* to determine ovulation and development of the corpora lutea.

Treatment consisted of an injection, *per cervix* into the lumen of the uterus, of a mixture consisting of 0.25 Gm. of intravenous aureomycin HC1,** 1.0 Gm. dihydrostreptomycin, and 100,000 units of crystalline penicillin in 125 ml. of sterile distilled water. This mixture was introduced in the uterine lumen by gravity, using a 20-in. metal uterine catheter† attached to a glass bottle by an intravenous apparatus. The catheter had an outside diameter of 4 mm. with a 15-degree bend and two lateral openings near the anterior tip.

The effects of the antibiotic mixture were tested at two different times during the estrous cycle. The first experiment dealt with cows treated seventeen days after the beginning of heat and consisted of 6 control and 7 treated animals. All animals in this group were inseminated during the second estrous period at the experimental barn, the first period being used to establish a base point from which to start the experiment.

The second group consisted of 16 treated and 19 control animals. The treated animals in this group received the infusion of antibiotics when they were first noticed in heat (first heat check) and were inseminated about twelve hours later; this was done during the first estrous period after entering the experimental barn.

The 48 animals which furnished data for these two groups averaged 5.5 years of age, with an average of 2.8 previous calvings. Twenty-eight cows were negative to the brucellosis test, while the remaining 20 were either classed as suspects or were positive to the test (in the experiment as a whole, 14 of the negative cows and 8 of the suspects and positive cows had normal embryos). Each cow had been inseminated 4 to 14 times (average, 7.2), previous to being placed on this study, without apparent conceptions. The average length of time between first and last service on the farm was 216 days. These cows also had an average period of 83 days from last breeding on the farm to the first experimental breeding. The time since last calving was usually not known.

*Semen furnished by Southern Wisconsin Breeders' Cooperative, Madison.

**Furnished by Lederle Laboratories, Division, American Cyanamid Co., New York, N. Y.

†Woelffer uterine catheter, Haver-Glover Laboratories, Kansas City, Mo.

RESULTS

Five of the 57 cows were removed from the experiment because of abnormalities which were not detected at the time of purchase, but which were observed either after entering the experimental barn or at the time of slaughter. This includes 2 animals with obstructions of the oviduct, 2 others which developed cystic ovaries, and 1 which became anestrous after purchase.

Results of Treating Seventeen Days Post-Heat.—There was a total of 16 cows assigned to this group, but data from 3 cows which had been assigned to be treated were not used. The reason for this in one instance was that the cervix was not sufficiently open to permit the passage of the catheter for treating. The other 2 cows were treated but failed to show estrus at the proper time. One of the 2 did not show estrus until forty-two days after treatment, although she may have had a quiet ovulation at about the time of expected heat. The other cow did not come into heat until

TABLE I—Effect of Antibiotics Upon the Percentage of Cows with Normal Embryos Thirty-four Days After Estrus

Group	Time of treatment	Group	Breed	First Expt. Breeding No. Cows	First Expt. Breeding % preg.	Second Expt. Breeding No. Cows	Second Expt. Breeding % preg.	Total for 2 breedings
I	17 days post-estrus	Treat.	Hol.	4	00.0	4	25.0	25.0
			Guer.	3	33.3	2	00.0	33.0
			Total	7	14.3	6	16.7	28.6
		Cont.	Hol.	4	25.0	3	66.7	75.0
			Guer.	2	00.0	2	00.0	00.0
			Total	6	16.7	5	40.0	50.0
II	first sign of estrus	Treat.	Hol.	9	33.3	6	16.7	44.4
			Guer.	7	00.0	7	28.6	28.6
			Total	16	18.8	13	23.1	37.5
		Cont.	Hol.	11	36.4	6*	33.4	54.5*
			Guer.	8	62.5	3	00.0	62.5
			Total	19	47.4	9*	22.2	57.9*

*One cow returned to estrus from the first breeding, but was not reinseminated, which makes the percentage value a minimum.

eighty-seven days after treatment. Her ovaries seemed to be inactive during this period.

For a treatment to be of the greatest practical use in the field, it must be of such a nature that it can be applied readily to most animals and it also should not interfere with the normal reproductive function of the animal. If the response of the 2 cows showing abnormal post-treatment estrous cycles was due to treatment, then the procedure has some disadvantages in field applications. But, since this study was concerned primarily with the effect of treatment upon early embryonic death, the data from these 2 cows were excluded from the final results.

Four Holstein-Friesians and 3 Guernseys were treated seventeen days after heat, and 4 Holstein-Friesians and 2 Guernseys were not treated and served as controls (table 1). There seem to be no consistent differences in response between the two breeds, therefore the data will be pooled and discussed in that manner.

One of the 7 treated and 1 of the 6 control animals had normal embryos thirty-four days after the first experimental breeding. A second breeding in the animals returning to estrus resulted, thirty-four days later, in 1 normal embryo from the treated animals and 2 normal embryos from the control animals.

The number of normal embryos present from both inseminations was 2 out of 7 (28.6%) for the treated animals as compared with 3 out of 6 (50.0%) for the control animals.

The Effects of Antibiotics Upon the Endometrium.—Semen placed in the uterine lumen of cattle, swine, or rabbits which have functional corpora lutea in their ovaries, often will produce a pyometra.[4,11,14,15] It has been suggested that the bacteria in the semen constitute the irritating agent. Since the mixture of antibiotics administered at seventeen days post-heat did not seem to be beneficial, it was decided to check its immediate effect upon the endometrium as an irritant.

Four repeat-breeder cows were used in this part of the study, 3 which had acted as controls for the previous group and had not conceived, and 1 which had not been on experiment previously. The same mixture of antibiotics was administered in the same manner as previously described. Two were infused during the luteal phase of the estrous cycle (16 or 18 days post-heat) and 2 were treated during estrus. These animals were slaughtered sixteen to forty-eight hours after treatment and observations were made on the endometrium.

The results from these 4 animals suggest that this mixture will cause the greatest disturbance within the uterus during the luteal phase of the estrous cycle. The uterine lumens of the 2 cows treated sixteen or eighteen days postestrous contained a yellow, cheesy exudate which could be observed macroscopically. This was not found in the 2 cows treated during estrus. Also, there was an epithelial denudation and an increased leukocytic infiltration in cows treated during the luteal phases as compared with those treated during the estrous phase.

Because of this greater endometrial reaction to the antibiotics during the luteal phase and the apparent lack of benefit at the two experimental breedings, it was decided to delay treatment until the time of estrus.

Results of Treating at the Time of Heat.—A total of 20 Holstein-Friesians and 15 Guernseys were used in this group, with 16 treated and 19 control animals. Of the 9 treated Holstein-Friesians and 7 treated Guernseys, 3 had normal embryos thirty-four days after the first breeding. The remaining 13 had 3 more normal embryos thirty-four days after the second breeding.

The controls consisted of 11 Holstein-Friesians and 8 Guernseys. Nine of the 19 untreated animals had normal embryos from the first insemination, and 2 of the 9 which were rebred also had normal embryos. One Holstein-Friesian which did not settle on first breeding was by misarrangement not rebred at second heat. This accounts for the discrepancy between the number of cows not having a normal embryo from first breeding and the number of cows involved in the second breeding.

The number of normal embryos present from both breedings was 6 for the 16 (37.5%) treated animals as compared with 11 for the 19 (57.9%) control animals. The percentage for the control is a minimum because of the cow which was not given the opportunity to settle at second breeding.

When the data for both breeds, in both groups, for the two breedings were pooled, there were 8 normal embryos from the 23 treated animals (34.8%) and 14 normal em-

bryos from the 25 control animals (56.0%) thirty-four days postestrus. This percentage, again, is a minimum because of the control cow which was not bred for the second time.

DISCUSSION

Due to the randomization of the cows to their groups, the variation in the rate of fertilization should be the same for the treated animals as for the controls. Therefore, differences between treated and untreated animals in the percentage of normal embryos present at thirty-four days postheat should be due to differences in embryonic death. If antibiotics, as used in this study, are beneficial in preventing lowered fertility, there should have been a higher percentage of the cows with normal embryos in the treated groups than in the nontreated groups. However, the percentage of normal embryos was 34.8 for all treated animals as compared with 56.0 for all nontreated animals. When this difference between the two groups is tested for statistical significance by the *Chi*-square technique, it is found not to be significant.

The first experimental inseminations of 109 "repeat-breeder" cows which have been used as controls in previous studies at this station have resulted in 27 normal embryos at thirty-four days (24.8%). The number of embryos present from the first experimental insemination in the 19 untreated cows acting as controls for the second group in this experiment was considerably higher (47.4%). The difference between these values is statistically significant.

Assuming embryonic death as a major cause for the failure of the 48 cows to settle, these data indicate that death occurs early in the gestation period. The length of time from insemination to the subsequent estrus in the 34 animals returning from the first experimental breeding and the 23 animals from the second experimental breeding averaged twenty-one and eight-tenths days, with a range of seventeen to thirty-three days. If these cows are repeat-breeders due to embryonic death, this death is occurring early enough so as not to delay the subsequent estrus. The uterus in 1 cow slaughtered thirty-four days after the second insemination contained no visible remains of an embryo; another cow slaughtered at the same stage had an embryo which was obviously degenerating. Death in these two instances may have been relatively late. All other animals either came into estrus previous to, or had a normal embryo at thirty-four days after, being inseminated.

Asdell *et al.*[2] emphasize the necessity of including control animals in any experiment designed to study the effects of a treatment upon cows with a poor breeding history. The present data bring out this fact very well. If only the 25 cows which received no treatment other than two more inseminations are considered, it will be noticed that 14 of them had normal embryos thirty-four days after insemination. If some treatment had been administered to these cows, the results would have looked impressive. These 25 cows had received an average of 6.8 inseminations, prior to being brought to the experimental barn. Certainly, these are "problem-breeding" cows. Yet 56 per cent of these 25 cows, without any treatment, were carrying normal embryos after being bred one or two more times. Of the 14 cows which had normal embryos, 10 resulted from only one more breeding, while the other 4 required the second breeding. This means that the normal embryos from these 14 cows resulted from an average of only 1.29 experimental inseminations.

These figures bring out the fact that clinically normal repeat-breeder cows can settle without treatment. Also, to determine the effect of a given treatment correctly, the results of such a treatment must be compared with the results on a comparable group of nontreated cows.

In this experiment, the difference between the results from the treated animals and from the control animals was not statistically significant. This can be interpreted to mean that the treatment had no "real" effect upon the number of embryos present thirty-four days after insemination and that the difference is due to chance.

The difference in the percentage of cows having normal embryos at thirty-four days postinsemination in the control animals of this experiment and those of previous experiments could be due to either of two factors: (1) Chance variation even though rare, and (2) variation in time which could change the population of cows being sampled. It is impossible to determine which has operated in this instance.

SUMMARY

A total of 57 cows which had been inseminated four or more times without apparent conception were used in this study. Treatment consisted of a mixture of 1 Gm. of dihydrostreptomycin; 0.25 Gm. of aureomycin, and 100,000 units of penicillin in 125 ml. of sterile distilled water placed in the uterine lumen.

Seven cows were treated seventeen days after estrus and inseminated at the subsequent heat. Sixteen other cows were treated at the beginning of heat and inseminated about twelve hours later. Twenty-five control cows were inseminated without treatment. All cows which returned to estrus after the first breeding were rebred. Those animals that had not returned to estrus by thirty-four days after a breeding were slaughtered and an examination was made for the presence of a normal embryo. The percentage of cows with normal embryos was 34.8 for the treated animals and 56.0 for the control animals. This difference was not statistically significant.

This mixture when placed in the uterine lumen during the luteal phase of the estrous cycle causes some endometrial inflammation as determined both grossly and histologically; it did not appear to do so when used at estrus.

The necessity of using control animals in this type of study is discussed.

References

[1]Almquist, John O.: A Comparison of Penicillin, Streptomycin and Sulfanilamide for Improving the Fertility of Semen from Bulls of Low Fertility. J. Dai. Sci., *34*, (1951): 819-822.

[2]Asdell, S. A., Fincher, M. G., Smith, S. E., and Elliott, F. I.: A Controlled Attempt to Restore Fertility in Dairy Cattle by Treatment with Gonadic and Gonadotrophic Hormones. Cornell Agric. Exptl. Sta. Memo. 243, 1942.

[3]Bartlett, D. E.: Infectious Diseases as a Cause of Infertility: A Review. J. Dai. Sci., *32*, (1949): 36-44.

[4]Black, W. G., Otto, G., and Casida, L. E.: Embryonic Mortality in Pregnancies Induced in Rabbits of Different Reproductive Stages. Endocrin. *49*, (1951): 237-243.

[5]Chambers, E. E.: Penicillin in the Treatment of Nonbreeding Cows. North Am. Vet., *29*, (1948): 640-641.

[6]Chapman, A. B., and Casida, L. E.: Length of Service Period in Relation to Productive Efficiency in Dairy Cows. Proc. Am. Soc. Anim. Prod., (1935): 66-70.

[7]Easley, G. T., and Leonard, R. H.: Bacteriological, Pathological and Clinical Studies of the Reproductive Tract of the Hereford Cow and a Bacteriological Study of Hereford Bull Semen. North Am. Vet., *32*, (1951): 258.

[8]Easterbrooks, H. L., and Plastridge, W. N.: Intrauterine Antibiotic Treatment of Vibrionic Sterility in Dairy Cows. J.A.V.M.A., *117*, (1950): 388.

[9]Hatch, R. D., Feenstra, E. S., and Jennings, L. F.: A Bacteriologic Survey of the Reproductive Tract of Infertile Cows. J.A.V.M.A., *114*, (1949): 131-133.

[10]Lindley, D. C., and Hatfield, R. C.: Observations on the Bacterial Flora of Infertile Dairy Cows. J.A.V.M.A., *120*, (1952): 12-15.

[11]McDonald, L. E., Black, W. G., McNutt, S. H., and Casida, L. E.: The Response of the Rabbit Uterus to Instillation of Semen at Different Phases of the Estrous Cycle. Am. J. Vet. Res., *13*, (1952): 419-424.

[12]Olds, D., Oliver, L., and Seath, D. M.: The Effect of Antibiotics on the Fertility of Bull Semen and their Relationship to the Estrous Cycle Length of Dairy Cattle Following Artificial Insemination. J. Dai. Sci., *34*, (1951): 966-970.

[13]Tanabe, T. Y., and Casida, L. E.: The Nature of Reproductive Failures in Cows of Low Fertility. J. Dai. Sci., *32*, (1949): 237-246.

[14]Tanabe, T. Y., Warnick, A. C., Casida, L. E., and Grummer, R. H.: The Effects of Gonadotropins Administered to Sows and Gilts During Different Stages of the Estrual Cycle. J. Anim. Sci., *8*, (1949): 550-557.

[15]Willett, E. L., McShan, W. H., and Meyer, R. K.: Relation of Source of Hormone, Dosage, and Stage of Cycle to Superovulation in Heifers. J. Anim. Sci., *7*, (1948): 545-546 (abstr.).

Replacement of Ureter by Small Intestine

Ureters are sometimes involved in carcinomas and other disease conditions. This may require the removal of a useful kidney. In an experiment, a section of the small intestine was substituted for the ureter. In 2 dogs, over half of the left ureter was removed and replaced by an isolated segment of small intestine with its mesenteric blood supply left intact. To thoroughly test the effectiveness of this operation, the right kidney in each dog was later removed. The dogs remained healthy. At autopsy one year later, the section of intestine was found not to have changed. Its epithelium had established direct continuity with that of the ureter at one end and with that of the bladder at the other end.—*Proc. Royal Soc. Med., Aug., 1952.*

False Extra-Uterine Pregnancy

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Baltimore, Maryland

The word "false" used in the title of this case history indicates that the ovum was not fertilized outside of the confined limits of the female reproductive tract, which of course would be termed a "true" extra-uterine pregnancy. Rather, the ovum was definitely fertilized within the female reproductive organs and in some manner transported out of the uterus to establish growth in some other part of the peritoneal cavity. This occurrence is definitely a rarity but, according to Roberts,[1] has been described occasionally in multiparous animals. However, it does classically illustrate how nature may afford a female the powers of reproduction at almost any cost, even at the cost of her own life. Also, it represents the remarkable flexibility of the diversified powers of the omentum which plays such an important role in the protection of the delicate organs in the peritoneal cavity.

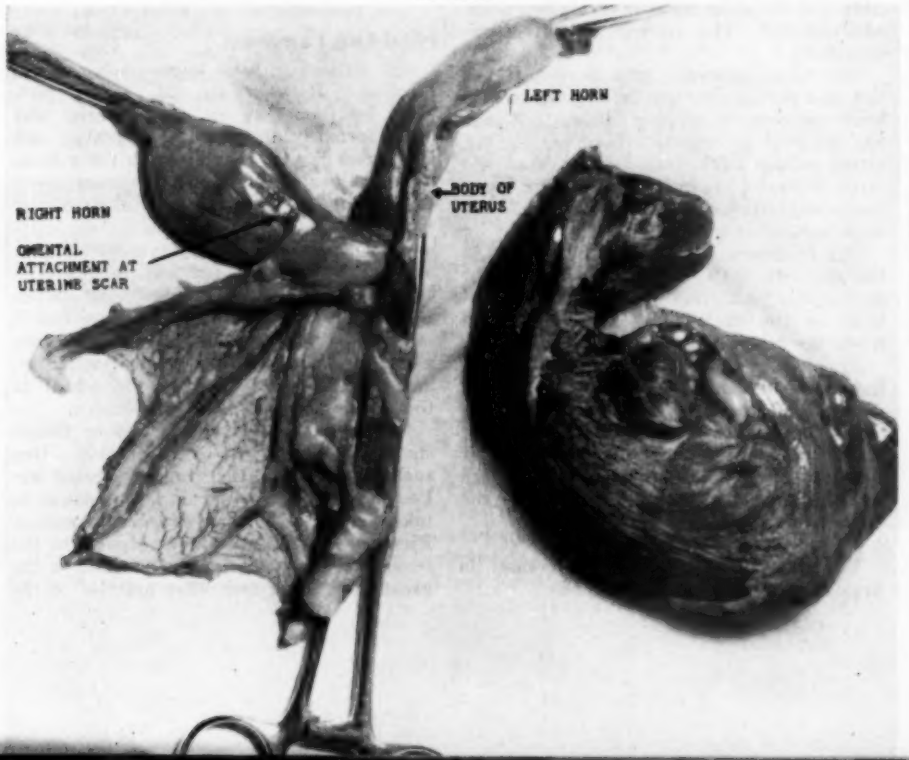
The patient presented was a 4-year-old domestic breed cat who, previously, had had several litters of kittens normally and without supervision. The cat was allowed complete freedom of the outdoors and no special precautions were taken by the owners to keep the animal confined during its estrous periods. The only history obtained was that the cat had appeared to be "in season" about two months previously and that about two to three weeks following the first symptoms of estrus the cat was found in the street injured. The owners assumed it had been involved in an automobile accident. The animal was lethargic for several weeks following this incident.

The symptoms when presented for treatment were those of dystocia. The owners reported the animal had been straining for several days in an unsuccessful attempt to deliver a kitten. The external genitalia were relaxed as for normal parturition. The temperature was 102.3 F., the pulse rapid. Physical examination revealed a large

Dr. Neserke is a practitioner in Baltimore, Md.

[1]S. J. Roberts, D.V.M., Cornell University, personal communication.

Fig. 1—The uterus of the cat, showing the omental attachment in the right horn; at the right is the fetus.



mass about the size of a full-term kitten in the anterior peritoneal cavity.

With the owner's consent, a laparotomy was performed. Ether was the anesthetic used. A median line incision was made through the linea alba. The uterus was found to be much enlarged but empty. The omentum had adhered to what was evidently a healed scar about ½ in. long in the right horn of the uterus. This omental attachment had apparently covered a rupture of the uterus (the rupture undoubtedly occurring at the time of the accident, allowing the fertilized ovum and fetal membranes to drop out of the uterus and into the abdominal cavity). The fetus was located immediately posterior to the stomach. The placental membranes were intact and covered almost completely by omentum. In fact, the omental attachment was so secure that the placenta was ruptured during removal of the fetus. The mass of blood vessels ventral to the fetus and attached to the omentum were probably a combination of omental and placental vessels and, undoubtedly, the result of a connection between the placenta and uterine horn.

The abdominal cavity was flushed several times with warm physiological saline to eliminate as much debris as possible. Penicillin (50,000 units aqueous crystalline) was administered. The patient recovered uneventfully.

The fetus appeared fully developed but had died perhaps twenty-four to forty-eight hours previous to surgery. It was felt that had surgical intervention been earlier, the kitten would have lived. Autopsy of the fetus revealed normal development, and death was attributed to anoxia. The lungs were saturated with fluid.

The functions of the omentum in aiding the placenta with vascularization and for mechanical protection of the fetus is symbolic of the usefulness of the omentum when the body calls upon it for aid.

In speculation of precisely what would have occurred had the animal not been operated on, the three most probable alternatives are: (1) possible mummification of the fetus; (2) possible disintegration of the fetus; and (3) possible death of the cat due to peritonitis, the latter being the most likely to occur.

The pupil of the eye can decrease its area 80 per cent in three seconds.

Drying Off Dairy Cows

There are three common methods of drying off dairy cows: (1) incomplete milking in which about half of the milk is left in the udder and the cows milked at increased intervals until dry; (2) intermittent milking where cows are completely milked but at increasing intervals; (3) complete cessation in which milking is completely stopped until the cow again freshens. Milk secretion is largely controlled by two things: (1) the hormone lactogen and (2) the nervous stimulation of milking. The hormone is the most important stimulus during the early stages of lactation while the milking stimulus is the most important during the later stages. Stopping abruptly does not seem to affect the composition, the bacterial count, or the amount of milk produced during the next lactation. It seems to be the preferred method except when chronic mastitis is present, in which case intermittent milking might be indicated. However, if an antibiotic is injected into the affected quarters, no further milking may be necessary. If the cow is a heavy producer, her grain and protein ration should be reduced simultaneously.—*Montana State College Farmer, May, 1952.*

Hind Leg Lameness

An authority half humorously relates (*Harness Horse*, July 23, 1952) how hind leg lameness in race horses was often formerly diagnosed and treated, and sometimes is yet. First search for a lump or a swelling. What caused the bump seems to have caused little concern. Then blister it, fire it, and blister it some more. However, if the leg is free of swellings, poke and punch the vast muscles of the quarters. Once he flinches, inject him with iodine. Iodine doesn't cure much elsewhere but it is expected to do the job when injected into a horse. Injections of hormones, vitamins, and antirheumatics are usually added to this technique nowadays.

However, the author adds, other things should be taken into consideration. One such is the circulation of the affected leg. Perhaps the vessels are not large enough to take care of the extreme demands of racing. First one should examine the pulse in the femoral artery, then in the tail and in the great metatarsal and other arteries of the

extremity. Also check the skin temperature below the hock. Then warm the horse for about 3 miles in ten minutes and repeat the examination for significant changes. If the pulse is gone, and if the skin below the hock is cold and clammy, and especially if it is numb to a pin prick, it is evidence that the circulation is insufficient. He warns that regardless of how large a jack the horse may have, one should look elsewhere for the cause of lameness.

One case is cited of chronic lameness in a polo pony which had developed a huge growth on the tibia as a result of being hit with a mallet. Repeated blistering and firing had been of no benefit. When the foot was later examined, it was found to be extremely sensitive. When the nerves were blocked, he went entirely sound. On postmortem examination, the navicular joint was found to be badly inflamed.

Embryotomy of Siamese Twins in a Buffalo Cow

G. S. CHINNIAH, V.S.

Colombo, Ceylon

A valuable buffalo cow on a Colombo (Ceylon) dairy farm had been restless and in pain for twenty-four hours. By noon on Dec. 25, 1951, the cervix had relaxed and the calf was ready to enter the pelvic cavity. The left foreleg was crossed over the back of the neck, the head was turned down in front of the pubis, and the right foreleg was bent at the knee. After about ninety minutes of fruitless effort, even though the calf was still alive, it was decided to perform an embryotomy. It was then discovered that it was a case of twins which could not be delivered separately. The cow was given 2 oz. of chloral hydrate and 3 million units of penicillin. It was soon learned that the twins were joined together at their posterior bellies from flank to flank. They were separated and, eventually, the second calf was brought out alive but it died a few minutes later. The entire operation took two hours and fifty minutes. The cow made an uneventful recovery.

Dr. Chinniah is a veterinary surgeon in Colombo, Ceylon.

Fig. 1—The dam one day after the operation.

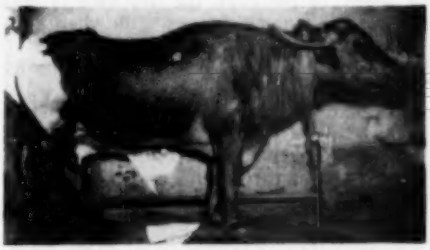


Fig. 2—The dam one month after the operation.

Uterine Contractility in Labor

To record the pressure exerted on the placenta during the third stage of labor, a mercury manometer was attached to the umbilical vein after birth of the child. The average intensity and frequency of the uterine contractions were found to be continuous with, and similar to, those of the second stage but they were painless. They drive the blood from the placenta to the child, then separate the placenta and expel it.

The average time from the birth of the child to expulsion of the placenta is six minutes. If it requires more than thirty minutes, it is considered to be a retention of the placenta. Five retentions occurred in the 80 cases studied. Ergometrine or pituitrin increases the tonus and frequency of the contractions. Analgesia during the second stage of labor seems to increase the proportion of placental retentions.—*Proc. Royal Soc. Med., Aug., 1952.*

Artificial Insemination in Poultry

Artificial insemination in chickens had its first commercial test this year in Alabama. In one flock where cage matings on a weekly basis had produced a hatchability of about 70 per cent, the hatchability was increased to about 80 per cent when artificial insemination was used.

This reduced the cost of maintaining more males since semen from 1 male would inseminate 6 hens. Pooling semen from 4 or 5 males seemed to improve fertility about 5 per cent. A fertility of 99 per cent and a hatchability of 85 per cent was attained in one flock. Test tubes and a medicine dropper are all the equipment required.—*Country Gentleman, Sept., 1952.*

Dropsical Calves

Breeders of Ayrshire cattle in Great Britain are disturbed by the incidence of dropsical calves. This condition, known also as edema or anasarca of newborn calves, seems to have a hereditary background. Data regarding 325 such calves in 60 herds indicate that it is due to a single autosomal recessive gene. Some calves are so slightly affected that the condition is not recognized. More of these calves are born dead than alive. In those that do live the edematous condition persists.

Cows carrying dropsical calves develop unusually large abdomens during the last two or three months of pregnancy due to an abnormal amount of amniotic fluid. Some cows have trouble in rising. The calves are generally carried to full term and, if the calf is delivered, the fetal membranes usually come away normally.

Breeders who recognize the condition usually send the cows to slaughter before calving time. Otherwise embryotomies are often required and some cows are lost. A study of the Ayrshire breed revealed that less than one-half per cent of the calves were dropsical but these tended to occur in certain herds; one herd had 66 affected calves in the last seven years.—*Brit. Vet. J., July, 1952.*

Research projects require many surgical procedures including hysterectomies in heifers and adrenalectomies in pigs.—*J. F. Bullard, D.V.M., Purdue University, Lafayette, Ind.*

Schistosomus Reflexus Dystocia

After encountering in one week 3 cows with dystocia due to a *Schistosomus reflexus* fetus, a practitioner made the following suggestions: First, try moderate forced traction applied to all four limbs. If this fails, then give epidural anesthesia and proceed with embryotomy. Decapitation of the fetus or the amputation of the forelimbs will probably be of little value, since traction at both ends of the fetus is usually contraindicated.

Embryotomy by means of a wire fetotome can seldom be accomplished because of the loose structures interfering with the wire. The rear limb should be amputated by incising the skin around the hip joint, then disarticulating by torsion and traction. The fetus can then probably be removed by traction on the head and forelimb.—*Vet. Rec., June 28, 1952.*

Semen Preserved by Freezing.—Pregnancies have been obtained with bull semen which had been stored at a –79 C. for seven months. After nine months at this temperature, semen appeared perfectly active and normal.—*Vet. Rec., Aug. 30, 1952.*

Repairing Hernias with Bone Flaps.—A flap of bone, with its tough fibrous membranes, taken from the patient's pubic bone without being detached from the abdominal wall tissues, may be used in repairing inguinal hernias in man. It gives a needed rigidity to the area.—*Sci. Newsletter, Sept. 13, 1952.*

Artificial breeding has steadily increased until 3,500,000 cows are estimated to have been thus bred in the United States last year. This is approximately 15 per cent of the nation's cows. In some dairy states the percentage ran as high as 25.—*Certified Milk, Sept., 1952.*

For retained placental membrane in cows give sulfonamides, intravenously or *per os*, and tyrothrycin, either in capsules or in solution, in the uterus. Don't worry about the membrane, you can't keep it from coming out.—*Wm. Riley, D.V.M., Michigan State College, East Lansing.*

X-Ray Selection of Breeding Pigs

The Cambridge School of Agriculture reports the use of the x-ray to count the number of ribs and vertebrae and also to measure the layers of fat in pigs. The number of ribs is found to vary from 13 to 17 pairs. The more ribs, the longer the pig and the greater proportion of lean meat to fat. Small pigs are stretched out under the x-ray camera while the bones are counted. Formerly this information was provided only after the animals were butchered.—*Vet. Rec., Aug. 30, 1952.*

Thyroid Removal Affects Sex Organs of Fowl.—Thyroidectomy diminishes the size and activity of the sex organs in fowl to a variable degree, depending on the amount of thyroid removal and the age at which it is done. Egg-laying was delayed about thirty-five days when the thyroid was totally removed from pullets when they were 3 months old and was delayed 180 days when the thyroid was removed when 3 weeks old. In males, it resulted in delayed and less frequent copulations.—*Vet. Bull., July, 1952.*

Effect of Antibiotics on Semen. — The semen of 7 bulls of low fertility was treated with either penicillin, streptomycin, or penicillin plus streptomycin (*J. Dai. Sci., 34,* 1951). This resulted in settling 19 to 26 more cows per 100 cows bred. The similar addition of sulfanilamide to the yolk-citrate diluent did not increase the breeding efficiency. The semen of 2 relatively infertile bulls was not benefited by any treatment.—*Vet. Bull., July, 1952.*

Aërial Transportation of Ova.—The first successful aërial shipment of fertilized rabbit ova for transplantation was recently reported. Two white California rabbits were superovulated and inseminated. Twenty-four hours later, they were destroyed and 74 fertilized ova, at the 2-cell stage, were recovered by flushing the fallopian tubes with whole rabbit serum. These were placed in thermos flasks and flown to Cambridge University, England. Twenty-seven hours after recovery, five ova were placed in each fallopian tube of 2 black rabbits. Thirty-two days later, one of these rabbits gave birth to 2 healthy white rabbits.—*Science, June 27, 1952.*

Arterial Embolectomy

A review of 18 cases of femoral or iliac artery embolectomy performed on human patients at Cook County Hospital (Chicago) from 1946 to 1951 revealed that 15 had died; the other 3 had their limbs amputated. The article comments that successful peripheral arterial embolectomy results in an immediate return of circulation and relief from symptoms. However, this is usually followed by a gradual occlusion of the distal arteries, days or weeks after the operation. The occlusion is frequently at the site of the sutured arteriotomy incision.—*Illinois Med. J., Feb., 1952.*

Cesarean Section in the Ewe

A British veterinarian was called to see a ewe that had been in labor for about four hours. He found a small pelvis and a large living lamb. The ewe was given 20 cc. of epidural anesthesia (tutocain), then turned on her back and the lower abdomen prepared.

An incision was made parallel with, and 2 in. lateral to, the left mammary vein from the front of the udder 7 in. forward. The lamb now was dead and the placenta was easily removed. A continuous Lembert suture of No. 1 silk was used to close the uterus. Interrupted silk sutures were used in the peritoneum and abdominal muscles. Powdered sulfanilamide was applied and the skin repaired with mattress sutures. The ewe was given penicillin for three days and made an uneventful recovery. The fetus weighed 14 lb.—*Vet. Rec., Aug. 16, 1952.*

Intrathoracic Anesthesia

Because of the frequent difficulty in injecting an anesthetic intravenously or intraperitoneally into a dog or a cat, one correspondent now injects it intrathoracically. Nembutal, injected into the thoracic cavity, has always induced a smooth rapid anesthesia with no failures or unsatisfactory after-effects.—*Vet. Rec., Sept. 6, 1952.*

CLINICAL DATA

New Therapy for Greater Production in the Cattle Industry

G. T. EDDS, D.V.M., Ph.D.; B. B. HANCOCK, D.V.M.; S. J. KING, A.B.

Fort Dodge, Iowa

THE RAPID increase in population within the United States and other nations of the world produces a continuing demand for greater production in the animal industries. The imperative need for a steady expansion of the world food supply is delayed by the continuous existence of a large number of animal diseases. It, then, is essential that there be close liaison between the research scientist, the veterinary practitioner, and livestock and poultry producers to develop effective measures for preventing and treating animal and poultry diseases.

These demands for greater production lead to requests for research in both the pharmaceutical and biological fields. Extensive research on animals and poultry is necessary before the introduction of all new drugs. This research, when successful, is naturally followed by field investigations or trials to prove the merit of the product under consideration.

Animal research, supplying new therapeutic agents, constitutes an arsenal behind both medical and veterinary medical practitioners. Goodpasture[1] describes the use of chicken embryos as a method for screening the effectiveness of new drugs against infectious diseases. In addition, mice, guinea pigs, rabbits, chickens, and dogs are used in the research laboratories of our veterinary biological and pharmaceutic laboratories for checking effectiveness and possible toxicity of new compounds.

SULFONAMIDES

The introduction of the sulfonamides into medicine constituted one of the epochal events in therapeutic progress. Several hundred sulfonamides have been tested for effectiveness, duration of adequate blood levels, side actions, and toxicity. Of this number, only a few have proved of value in clinical medicine. The greatly improved efficiency of animal disease control with the earlier sulfonamides was handicapped to some degree by the occasional occurrence of kidney damage. Research workers found that this damage could be circumvented by combining two or more sulfonamides and giving the same total daily dosage. Lehr[2] was one of the first to suggest the use of such combinations. He reported a markedly decreased incidence of crystalluria with a mixture of two or more sulfonamides, as compared with the same dosage of either of the single agents when given alone. Such combinations are still popular in veterinary medicine.

One of the newer sulfonamide drugs, sulfisoxazole, is characterized by greater solubility in the urine of animals at a pH at which many of the other drugs would crystallize out in the tubules. Research demonstrated that no kidney damage resulted when this drug was used.[3] It is perhaps the most popular one being used in human medicine at the present time.

Administration of gantrisin® at intervals produced an adequate blood level. The clinical effectiveness of gantrisin was superior to that of sulfamezathine,[4] and the incidence of toxic action in these patients was low. Lazarus and Schwag[5] reported that the continued administration of gantrisin to rats and rabbits over long periods showed no evidence of kidney toxicity.

Marshall[6] observed that gantrosan (gantrisin) is distributed principally in the extracellular fluid which differs from the distribution of sulfamerazine, sulfadiazine, or even sulfanilamide. He stated, then, that the same amount of gantrosan should give blood levels about twice that of sulfadiazine or sulfamerazine and three times the concentration of sulfanilamide. He also

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Presented before the Alberta Veterinary Conference at Calgary, June 6, 1952.

proposed that the apparent failure of gantrosan to enter the cell should make it less toxic than those drugs which do enter the cell.

Experimental work at Fort Dodge Laboratories proved that sulfisoxazole was effective for treating coccidiosis, typhoid, and cholera of poultry;[7] foot rot, shipping fever, and pneumonia of cattle.[8]

Blood level determinations were run in our laboratory using the Marshall-Bratton[9] technique with an Evelyn photoelectrometer. Initial trials on dogs using ½ gr. per pound of body weight demonstrated that this drug belonged to the sulfadiazine group as far as persistence of blood levels was concerned. Blood levels of dogs receiving sulfisoxazole orally, 4/5 gr. per pound daily, showed that effective levels could be expected in the majority of cases. The data presented in table 1 summarizes these determinations.

We were also interested in determining the results of an initial dosage of 4/5 gr. per pound followed by 3/10 gr. per pound every eight hours. In the series of dogs receiving this dosage, an average level of 10+mg./100 cc. was produced. This data is presented in table 2.

Determinations were also made on cattle and it was found that they may be divided into two general classes: one group of 8 animals showed a high and persistent level with a single oral dose daily. This is presented in graphic form in table 3.

Another group of animals may show more rapid elimination of the drug, but the blood level for these animals can be maintained at an adequate concentration by dividing the daily dose and giving 3/10 gr. three times daily. Our research thus has demonstrated that blood levels which are generally accepted as being within the therapeutic range demonstrated by the sulfonamides could be expected using sulfisoxazole. Clinical results have confirmed the predicted good therapeutic responses.

This drug has recently been combined with the product phthalylsulfathiazole for the combined local and systemic effects of these two drugs. The superior properties

TABLE 1—Averages of Blood Levels in 16 Dogs Receiving a Soluble Salt of Sulfisoxazole Orally

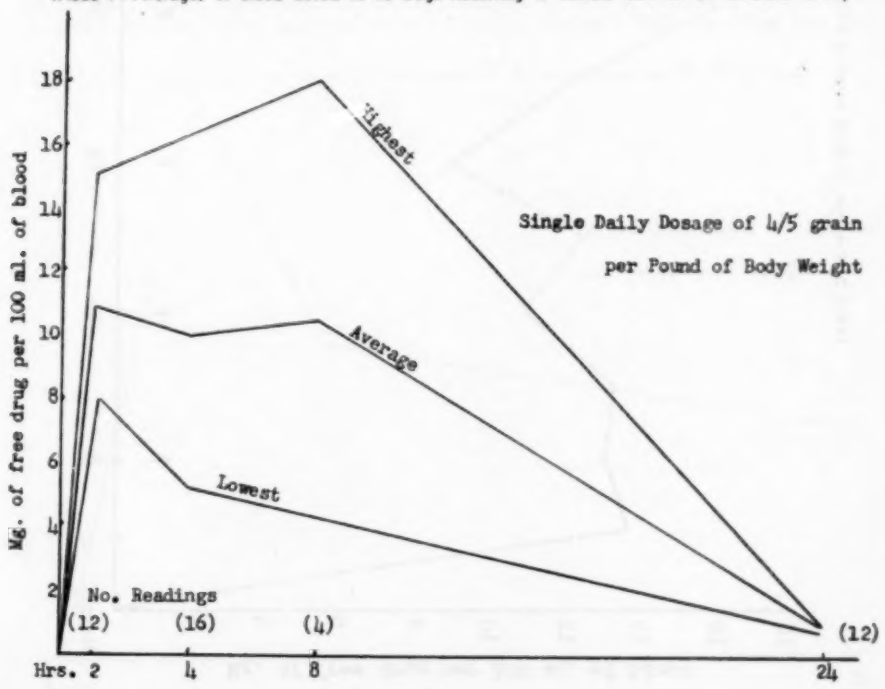
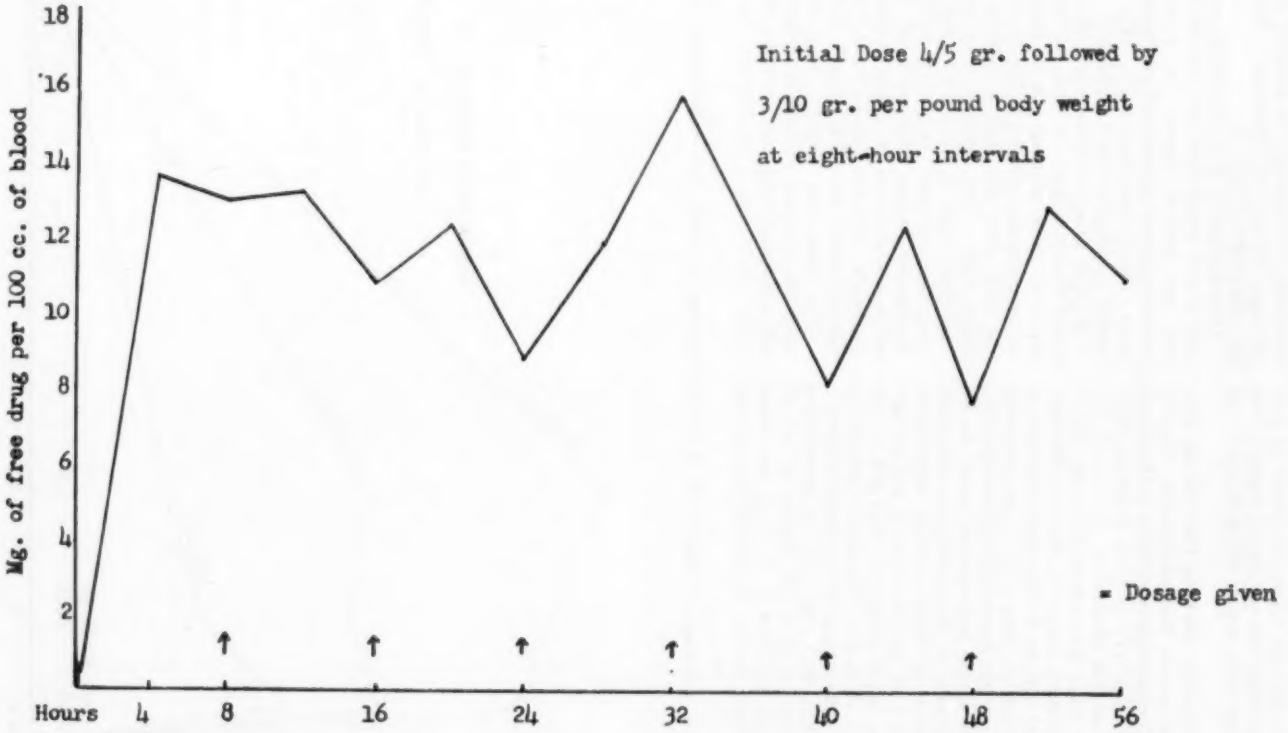


TABLE 2—Averages of Blood Levels in 8 Dogs Receiving Sulfisoxazole Orally



of the phthalylsulfathiazole, as reported by Scheidy,[10] include low toxicity, sparing absorption, and bacterial inhibition within the gastrointestinal tract. This drug then is used for its local action, and sulfisoxazole is included to combat pneumonia and secondary infections accompanying calf scours. In addition to these sulfonamides, most companies are selling a product including kaolin, pectin, and other agents which help check diarrhea.

CORRECTING NUTRITIONAL DEFICIENCIES

Further efforts to increase the rapidity of growth of animals have demonstrated the beneficial effectiveness to be expected when proper minerals are included in the rations of animals and poultry.

It was demonstrated in Maine that cobalt deficiency in young dairy heifers resulted in anorexia, emaciation, long, rough coat, and greatly retarded growth. This condition was corrected by adding 1 oz. of cobalt sulfate to 1 gal. of water. One teaspoonful of this solution was placed on the grain and fed once daily. Three days of feeding the cobalt-fortified ration resulted in improved appetite, and in three weeks these calves had gained up to 40 lb. per head.

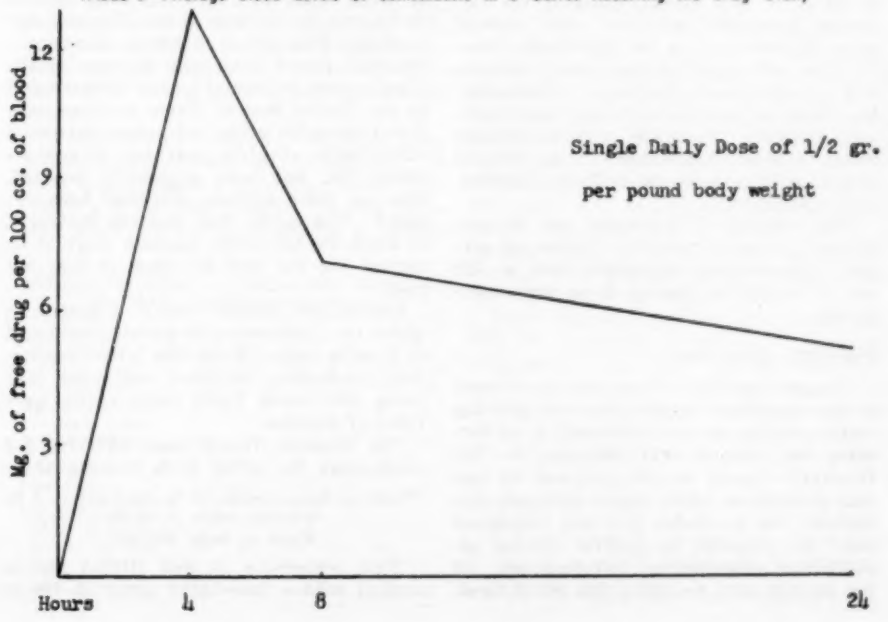
Moxon[11] states that cattle consuming large amounts of roughage may suffer from iodine or cobalt deficiencies in certain parts of the United States. These trace elements could be supplied in the form of a trace mineral salt and the deficiency conditions could be prevented.

In those areas where selenium is prevalent, Moxon states that the addition of a small amount of arsenic will serve to block the toxic effects of the selenium.

Becker[12] recognized the importance of phosphorus in normal cattle conditions. When the phosphorus level was too low there was anorexia, drop in fertility, slower rate of growth, decrease in milk production and, after a time, light weight, "shelly bones" were noted. It is recommended that 13 to 15 Gm. of phosphorus per day be supplied mature cattle, and 18 Gm. of phosphorus be included in the ration of cows in heavy lactation.

A new disease of importance to the cattle industry, and produced by deficiency of vitamin E in the ration, is called "white muscle disease." This condition has been

TABLE 3—Average Blood Levels of Sulfisoxazole in 8 Calves Receiving the Drug Orally



produced experimentally in lambs by Culik.[13] The symptoms in lambs were locomotive disturbances and general muscular dystrophy with an involvement of the skeletal and cardiac muscles. The muscle involvement was characterized by reluctance to walk and cross small obstacles. These lambs later showed a definite stiffness, especially of the hind legs, with an inability to get up. After standing for a short time, the animals would sway and fall. The lambs later showed complete paralysis of the fore and hind legs.

TABLE 4—Clinical Results from Treatments for Sterility

Treatment	Cows (No.)	Pregnant (%)
Massage of ovaries and uterus and removal of corpus luteum	123	63
Same + 1,000 I.U.P.M.S.	122	72
Hormone alone (1,000 I.U.P.M.S.)	92	78
Control (just examination)	72	76

On postmortem, the most characteristic lesion was a flacid, flabby condition of the right ventricular wall. There was also an increase in the amount of fluid in the pericardial sac.

Vitamin E deficiency in calves was observed in several parts of North America in 1951. It was characterized by the following symptoms: peracute cases showed acute degeneration of the ventricular myocardium with signs of respiratory distress and a frothy nasal discharge. Frequently, the calves or cattle were found dead without symptoms. Subacute cases were more likely to show involvement of the skeletal muscle with progressive stiffness, prostration, and death.

This vitamin E deficiency can be corrected in a large majority of cases by giving a preparation containing 500 to 750 mg. of synthetic vitamin E or alpha-tocopherol.

FERTILITY PROBLEMS

Another problem of continuing interest to the veterinary practitioner who is doing cattle practice is new information on fertility and factors that influence it. Dr. Roberts[14] reports results obtained on certain procedures which might influence conception. He concludes that any treatment must be preceded by careful clinical observations, examination, and diagnosis. At the present time, he states that many treatments are "popular" and rather empirical. He presents the data in table 4 to substantiate his claim.

In another series, Roberts reported work on 37 cows and concluded that the synthetic estrogen product dienestrol gave as good or better results in stimulating ovulation and conception as the natural estrogens. The data on which the conclusions were based are summarized in table 5.

A great deal of experimental data is available concerning the influence of antibacterial agents on the fertility of bovine semen. Bratton *et al.*[15] compared the influence of these agents on the percentage of cases conceiving after a first service. In bulls showing high fertility, penicillin proved superior to the other agents in decreasing the number of animals returning after the first service. In bulls of low fertility, the addition of penicillin, streptomycin, or a mixture of penicillin-streptomycin-sulfonamides and polymyxin produced much better results than either sulfonamides or polymyxin alone. The data is presented in table 6.

MISCELLANEOUS

Cattle Grubs.—The serious damage done to cattle hides by grubs has been studied thoroughly by workers at the Montana Agriculture Experiment Station (Bozeman). Scharff[16] stated that such damage to the hides causes an annual loss of $100,000,000 in the United States. These workers have found the cattle grubs to be more numerous on the backs of calves, yearlings, or animals which had not been previously exposed, than on older animals that had been exposed. The cattle grub must be destroyed to block its life cycle, because there is no control for the heel fly since it does not feed.

Gibson and Twinn[17] report a project in which the grubs were completely eradicated in 50 milk cattle. From this initial locality, this eradication program continued four years and about 2,000 dairy cattle were freed of warbles.

The formula found most effective for eradicating the cattle grub consists of

Cube or derris powder (5 % rotenone) — 5 lb.
Wettable sulfur — 10 lb.
Water to make 100 gal.

This suspension is well stirred and is applied with a fan-shaped spray at 400 to

600-lb. pressure. The least amount applied per animal is 1 gal.

In order to kill the maximum number of grubs in a two-treatment program, it is recommended that the first treatment be applied just before the first grubs are ready to emerge and drop to the ground.

clover. "Chronic bloaters," or those animals which bloat readily on other feeds, probably have a defective nervous system. The accepted cause of bloating in ruminants is a lack of coarse feed which will stimulate the reticulum and rumen wall to cause belching. The California workers explain

TABLE 5—Comparison of Synthetic and Natural Estrogens in Stimulating Ovulation and Conception

	Cows (No.)	Ave. No. services before treatment	Conceived			
			1st service	2nd service	subsequently	Sold sterile
Gonadotropes	16	3.44	6 (37.5%)	1 (6.3%)	4 (25.0%)	5 (31.3%)
Dienestrol (dinodex)	31	3.03	18 (58.1%)	2 (6.4%)	6 (19.4%)	5 (16.1%)

The treatment is repeated in sixty days. This is reported to give a 75 per cent kill of the grubs of *Hemophilis bovis* and *Hemophilis lineatum*.

Hyaluronidase.—Another relatively recent therapeutic agent being utilized by the veterinarian is hyaluronidase. This agent, which aids in diffusion of drugs along the connective tissue spaces, has been advantageously used by veterinary surgeons in producing deep nerve block and in instances where it is of value to insure a deep infiltration of the local anesthetic. Roberts[18] states that hyaluronidase has questionable value for superficial or subcutaneous anesthesia or in nerve block anesthesia where nerves can be readily located.

Bloat.—Finally, certain animals seem predisposed to repeated development of bloat under certain conditions. Mead[19] and workers in California report that all cattle may bloat if pastured in alfalfa or Ladino

TABLE 6—The Effect of Antibacterial Agents on the Fertility of Bovine Spermatozoa

	No agent (control)	Sulfanilamide	Penicillin	Streptomycin	Polymyxin	All combined
High fertility bulls % 60- to 90-day non-ret. 1st serv.	65	66	71	69	67	68
Difference (expt.-cont.)	0	+ 1	+ 6	+ 3	+ 2	+ 3
Low fertility bulls % 60- to 90-day non-ret. 1st serv.	58	61	68	69	61	73
Difference (expt.-cont.)	0	+ 3	+10	+11	+ 3	+15

the greater prevalence in animals feeding on legumes on the basis that the leaves are smooth and succulent and may be eaten faster causing the gas to form faster.

Treatment and prevention include the supplemental feeding of 8 to 10 lb. of sudan hay in the corral at night. The use of 30 to 60 cc. of turpentine, aromatic spirit of ammonia, kerosene, or some of the new synthetic agents which increase surface tension, results in a much quicker recovery of the bloated animal.

SUMMARY

In summary, a number of new drugs have been developed recently which enable veterinarians to provide better therapy for cattle. These include sulfisoxazole, both alone and in combination with phthalylsulfathiazole, new information on the importance of the trace minerals, alphatocopherol for "white muscle disease," synthetic estrogens, antibiotics as agents to increase the fertility of bull semen, a new formula for grub control, hyaluronidase, and new agents for controlling bloat.

Many disease conditions of animals are still not amenable to therapy. Therefore, continuing coöperation among veterinarians, research workers in commercial laboratories and experiment stations, and livestock and poultry producers will supply new products of greater merit for the benefit of mankind.

References

[1]Goodpasture, E. W.: Some Uses of the Chick Embryo for the Study of Infection and Immunity. Am. J. Hyg., *28*, (1938): 111.

[2]Lehr, D.: Sulfacetamide, Sulfa Mixtures, Preven-

tion of Renal Complications. J. Urol., *55*, (1956): 548.

[5]Brickhouse, R. L., Lepper, M. L., Stone, T. E., and Dowling, H. F.: Gantrisin, Treatment of Pneumonia and Other Infections. Am. J. Med. Sci., *218*, (1949): 133.

[6]Ferguson, J. L.: Gantrisin in Urinary Infections. Lancet, *255*, (1948): 969.

[7]Lazarus, J. A., and Schwag, L. H.: Gantrisin, a New Sulfonamide for Urinary Infections. J. Urol., *61*, (1949): 649.

[8]Marshall, E. K., Jr.: Gantrosan. Modern Hosp., March, 1949.

[9]Edds, G. T.: Modern Therapy in Veterinary Medicine. Bio-Chem. Rev., *22*, (1952): 2.

[10]Unpublished clinical reports; available to those interested.

[11]Bratton, A. C., and Marshall, E. K., Jr.: New Coupling Component for Sulfanilamide Determination. J. Biol. Chem., *128*, (1939): 537-550.

[12]Scheidy, S. F.: Newer Sulfa Drugs. M.S.C. Vet., 7, (1947): 3.

[13]Moxon, A. L.: Trace Elements in Nutrition. Feedstuffs, *24*, (1952): 38-41.

[14]Becker, R. B., Neal, W. M., and Shealy, A. L.: Stiffs or Sweeney in Cattle. Florida Agric. Exper. Sta. Bull., 264, 1933.

[15]Culik, R., *et al.*: Vitamin E Deficiency in the Lamb. J. Anim. Sci., *10*, (1951): 1006.

[16]Roberts, S. J.: Treatment of Repeat Breeders. Paper presented at the Cornell Veterinary Conference, 1952.

[17]Bratton, R. W., Foote, R. H., Collins, W. J., and Dunn, H. O.: Artificial Insemination Problems and Why We Do What We Do. Paper presented at the Cornell Veterinary Conference, 1952.

[18]Scharff, D. K.: Cattle Grubs. Montana Agric. Exper. Sta. Tech. Bull., 471, 1950.

[19]Gibson, A., and Twinn, C. R.: Warble Fly Control in Canada. Scient. Agric., *17*, (1936): 179-198.

[20]Roberts, S. J.: An Evaluation of Hyaluronidase in Large Animal Therapy. Cornell Vet., *41*, (1951): 321.

[21]Mead, S. W., Cole, H. H., and Regan, W. M.: Production and Prevention of Bloat in Cattle on Alfalfa Pasture. J. Anim. Sci., *2*, (1943): 285.

For shipping fever, use streptomycin and sulfonamides. Treat the less acute cases by dissolving sulfathiazole sodium in their drinking water.—*W. V. Hornbacker, D.V.M., Indiana.*

Cattle with chronic snakeroot poisoning resemble those with Johne's disease. The poison passes through the cow's milk. If snakeroot is present, avoid woodland pastures after mid-August. — *A. A. Case, D.V.M., University of Missouri, Columbia.*

Renal Coccidiosis in Geese

J. K. McGREGOR, D.V.M.

Guelph, Ontario

During July, 1951, renal coccidiosis was diagnosed in a flock of geese on a Halton County farm in Ontario. *Eimeria truncata* was ascertained to be the parasite involved.

Losses in the flock had occurred over a period of three years. To what extent these losses were due directly to coccidiosis could not be determined.

Diagnosis of renal coccidiosis was based on the presence of characteristic oöcysts in the feces and crushed kidney tissue smears from 3 dead goslings submitted for autopsy. The kidneys showed whitish lesions resembling cooked rice grains distributed in a heavy concentration over the surfaces of the organs. The lesions were approximately 1 mm. in diameter. Prepared sections of kidneys showed an extensive involvement of the parenchyma and masses of developing oöcysts.

Inspection of the affected flock showed 8 to 10 birds out of 250 goslings to be emaciated, retarded in growth, and unable to use their legs or to balance properly. Some sick birds could support their heads and necks only with difficulty. Extremely affected birds placed near feed or water would eat and drink normally. Examination of fecal samples from the sick birds revealed numerous oöcysts. In this instance, less than 10 per cent of the flock showed clinical disease.

Clinically sick birds were isolated and the remainder of the flock was removed to clean ground. The owner was advised to separate the younger birds from the older ones, and a program of sanitation was recommended.

Sodium sulfamethazine in 1:1,000 solution was given in the drinking water to both the healthy and sick birds. Medication was given for four days, interrupted for two days, then administered for two more days. This schedule was to be repeated after one week if needed.

Sickness among the birds stopped during application of the first course of treatment and all sick birds recovered. The need for a second course of treatment was not apparent but, to insure favorable conditions, sodium sulfamethazine was again recommended for four days.

Dr. McGregor is on the staff of the Ontario Veterinary College, Guelph.

Untreated controls were not kept in this case. Evidence of coccidiosis was offered by the oöcysts in the feces of sick birds, together with the similarity of symptoms to those exhibited by birds that died with the condition.

More adequate investigation will confirm or disprove the efficiency of sodium sulfamethazine as a specific for renal coccidiosis. Of three strains of geese on the same premises and exposed to equal infection, only birds of the White China strain showed clinical symptoms of renal coccidiosis at any time.

This report of *E. truncata* infection is not the first recorded for Canada or Ontario. Wickware[6] reported renal coccidiosis in Quebec, and Glover[1-5] subsequently found some 13 cases during five successive years in Ontario. Although the drug or dosage was not indicated, Glover has reported successful treatment of coccidiosis using one of the sulfonamide drugs.

References

[1]Glover, J. S.: Report of Poultry Diseases Laboratory Service. Ann. Rep. of Ontario Veterinary College for 1946, Ontario Dept. of Agric., Toronto, Ont., (1947): 66.

[2]Glover, J. S.: Report of Poultry Diseases Laboratory and Extension Service. Ann. Rep. of Ontario Veterinary College for 1947, Ontario Dept. of Agric., Toronto, Ont., (1948): 89.

[3]Glover, J. S.: Report of Poultry Diseases Laboratory and Extension Service. Ann. Rep. of Ontario Veterinary College for 1948, Ontario Dept. of Agric., Toronto, Ont., (1949): 99.

[4]Glover, J. S.: Report of Poultry Diseases Laboratory and Extension Service. Ann. Report of Ontario Veterinary College for 1949, Ontario Dept. of Agric., Toronto, Ont., (1950): 75.

[5]Glover, J. S.: Report of Poultry Pathology Laboratory. Ann. Rep. of Ontario Veterinary College for 1950, Ontario Dept. of Agric., Toronto, Ont., (1951): 83.

[6]Wickware, A. B.: Notes on Miscellaneous Diseases of Geese. Canad. J. Comp. Med., *5*, (1941): 21-24.

Canine Hydrocephalus

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Recently a Chihuahua dog, 3 months old, was presented to the clinic with a history of poor appetite, unsteady gait, apathy, and pain when any part of the head was touched.

Drs. Banks and Monlux are on the staff of the School of Veterinary Medicine, Texas A. & M. College, College Station.

Inasmuch as this breed of dog is characteristically brachiocephalic, it was compared with a normal dog of the same breed and age (fig. 1). A comparison of the eyes of the 2 dogs shows the affected dog (right) to have a squinty, dull look frequently associated with intracranial pressure. Also, the enlargement of the crown and forehead is obvious. A tentative diagnosis of hydrocephalus or tumor, causing pressure in the brain, was given.

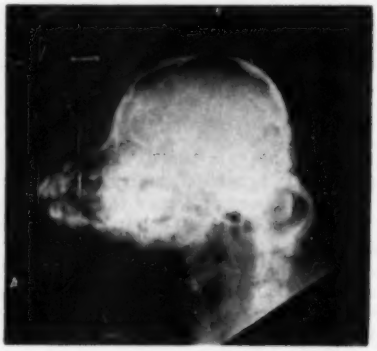
The blood picture was essentially negative. The roentgenogram (fig. 2) revealed an enlarged skull and apparently a dense

Fig. 1—Dull appearance of the affected dog (right) compared with normal dog of same age and breed.

—*F. P. Jaggi, D.V.M.*

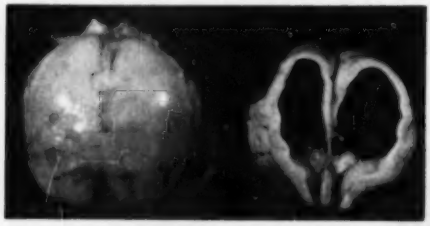
—F. P. Jaggi, D.V.M.

Fig. 2—Roentgenogram showing dense mass beneath dorsal wall of cranial cavity (affected dog).



—F. P. Jaggi, D.V.M.

Fig. 3—Roentgenogram showing clear space beneath dorsal wall of cranial cavity (normal dog).



—F. P. Jaggi, D.V.M.

Fig. 4—Greatly enlarged ventricles as revealed by autopsy findings.

mass ventral to the open fontanels and dorsal to the cerebrum. This was not shown on the roentgenogram of the normal dog (fig. 3). The mass was suggestive of a tumor. Several more films were obtained in the following six weeks with the same radiographic appearance.

During this period, the owner reported that the dog seemed dull, lacked the usual puppy playfulness, showed moderate anorexia and that sometimes, when the neck was bent to drink or eat, vertigo resulted.

When 5 months old, the dog was returned to the clinic for euthanasia. At this time, he presented upper respiratory symptoms and lacrimation. Several more roentgen films were made just before death. The findings were similar to the original film.

The autopsy revealed a hydrocephalus of marked degree. It was determined that the dense mass previously noted below the fontanels and suggestive of a tumor was the thin cerebral cortex, and what was believed to be the cerebrum were the enlarged, fluid-filled ventricles (fig. 4).

COMMENT

A review of the case indicates that an earlier, accurate diagnosis of hydrocephalus might have been made by considering the lack of change in the serial films and the lack of progressive pathological signs expected with a neoplasm.

Also, an accurate evaluation and interpretation of the roentgenograms would have supported the clinical findings.

Mickey, a Wire-Haired Terrier narcotics agent, has been retired at the age of 9. In the past five years, he has sniffed out more than half $1 million worth of opium and marijuana. His sensitive nose had been trained to locate the rooms and hideouts where the stuff was hidden. With raiding squads, he has worked from San Francisco to New York.—*Our Dumb Animals, Oct., 1952.*

A rabbit that moves like a Dachshund, instead of hopping, has been developed in California by mutation from a strain of New Zealand White rabbits. The recessive hereditary character of this "Dachsrabbit" is the result of abnormal cartilage development. It seems normal at birth but its limbs become deformed as it develops.—*Sci. Newsletter, Sept. 20, 1952.*

For sinusitis in tom turkeys, inject 75 mg. of streptomycin into the affected sinus. —*C. L. Nelson, D.V.M., Iowa.*

Scrapie Found in California Sheep

The Secretary of the United States Department of Agriculture on Oct. 3, 1952, issued a declaration of a state of emergency with reference to *scrapie* in sheep to facilitate the eradication of that little known but usually fatal disease. This slow-developing virus, neurosis disease of sheep, never before diagnosed in the United States, has been found on two farms in Butte County; California, according to Dr. A. G. Boyd, the state veterinarian.

Scrapie was first recorded in 1732 in England and later in Germany and France. It has caused serious losses in the British Isles for many years. It first appeared in Canada in 1945 and since then in Australia and New Zealand. Canada and Australia have slaughtered all infected and exposed animals in a campaign to eradicate the disease. Because of its long incubation period, tracing its source and controlling it are difficult. The present disease may have been imported with breeding sheep from Ontario, Canada, in 1948.

The infectious agent is located in the brain, spinal cord, or spleen. It is sufficiently resistant that it can be transmitted by contaminated pastures, also by congenital infection through either parent, even without the parent showing symptoms, and by intracerebral or subcutaneous inoculation.

The incubation period is said to be from eighteen months to three years or longer. The symptoms develop very gradually, commencing with an afebrile nervousness and progressing to tremors, pruritus, weakness, locomotor incoördination, and occasional convulsions. At first the shepherd may notice only that the animal is developing a more nervous temperament but later a stiff carriage of the head, an unnatural position of the ears, and tremors of the lips or even a grinding movement with the teeth may be observed. Symptoms are exaggerated when the animal is excited.

The lesions, even after the protracted illness, usually consist only of typical vacuoles in the neurons of the medulla and chord and the skin abrasions caused by scratching. Scrapie must be differentiated from scabies and from possible plant poisonings.

There is no known treatment for scrapie. In eradicating the disease, the carcasses of normal animals in the infected flocks could be salvaged by heat-processing methods.

The National Swine Disease Research Foundation was recently given a hearty endorsement in an editorial in *Hoard's Dairyman*. It states, "If the swine industry can point the way through their foundation, financed at the rate of 1 cent per hog marketed and 1 cent per hog recorded, we believe a great forward step will have been taken to assure the future progress and profit of livestock farming." — *Hoard's Dairyman, Sept. 25, 1952.*

In the past year, fat cattle prices have dropped about $4 per hundred, stocker and feeder prices about $8, with utility cow prices as much as $10 compared to last year. Wholesale beef prices have dropped from 2½ to 16 cents a pound but retail beef as yet has dropped very little.—*Am. Cattle Producer, Oct., 1952.*

A company which was advertising a mineral supplement with the claim that it would kill cattle grubs as they arrived in the backs of cattle was advised by the California Department of Agriculture to desist until their claims had been successfully demonstrated. This seems quite analogous to the claims for trace minerals, as a preventative or cure for brucellosis, which were recently proved false by the University of Wisconsin.—*Livestock Conservation News, October, 1952.*

The first case in Switzerland of Toxoplasma lesions in the brain of a hen is reported. She had developed symptoms similar to those of fowl paralysis.—*Vet. Bull., July, 1952.*

Anthrax in Animals and Man.—In 1949, anthrax occurred in cattle in Morbihan, France. An inaccurate diagnosis resulted in the slaughter of some affected animals for human consumption. The result was that 15 persons developed anthrax, all in the form of skin infections. The incubation period was from two to five days.—*Vet. Bull., July, 1952.*

Brucella Suis Infection in Suckling and Weanling Pigs. II

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Beltsville, Maryland

THIS EXPERIMENT was designed to provide more definite information on the course of *Brucella suis* infection in suckling and weanling pigs. Emphasis was placed on investigating the effect of weaning age on the course of the disease, the extent of latent infection in pigs that have sucked infected dams, and the transmissibility of brucellosis from infected to uninfected pigs of the same age and sex.

Since an adequate survey of the literature on this subject has been reviewed in the first paper of this series by Manthei *et. al.*,[2] there will be no repetition of that material in this report.

MATERIALS AND METHODS

All the pigs were mixed breeds and were farrowed by parent stock which was obtained from a common source known to be Brucella-free. Freedom from infection in the breeding stock was confirmed by the tube and plate agglutination tests and culture of the blood on arrival at the Animal Disease Station. These animals were maintained in Brucella-free pens during the breeding and gestation period until about two weeks prior to their farrowing date. The sows were then moved to Brucella-free farrowing barns where each sow and her litter were kept separately in individual farrowing pens and runs.

Immediately preceding exposure to virulent *Br. suis*, milk, genital excretions, and blood were collected aseptically for direct culture and inoculation into guinea pigs. The milk whey and blood serum were also tested for Brucella agglutinins. All of the specimens were negative for Brucella at this time.

Studies were conducted on 244 pigs that were naturally exposed to their dams that had been artificially infected with virulent *Br. suis*, strain 3-Boars, immediately following the current farrowing. The pigs were divided into two groups according to the time when they were born.

The pigs in group C were born approximately one year prior to those in group D. This group consisted of 57 pigs farrowed by 9 sows. Within a period of three to six days following farrowing, the dams were exposed to virulent *Br. suis*. This strain of *Br. suis* was a lyophilized culture that was reconstituted and propagated on serum-potato infusion agar medium. A forty-eight hour growth of *Br. suis* organisms was suspended in buffered physiological saline solution for exposure purposes. The dams were injected subcutaneously in each flank with 0.25 cc. amounts of this suspension. The amount of viable organisms each of the dams received varied from 5,900,000,000 to 9,300,000,000. The average dose was 7,805,555,555 organisms.

Although all of the dams had serum-agglutinin titers of 1:200 or higher, *Br. suis* was isolated from only a few of them after a lapse of approximately twenty-two days following initial exposure. Therefore, it was decided to reëxpose these animals to insure adequate exposure of the suckling pigs. The dams were reëxposed by injecting 15,300,000,000 viable organisms of virulent *Br. suis* into the lateral ear vein. Within nine days after reëxposure, Brucella organisms were isolated from the blood of all the dams. Brucella was also isolated from the milk and/or genital excretions of all but 1 of the dams during the suckling period.

Each litter was kept isolated during the suckling period. The dams were removed from their litters when the pigs were 48 to 62 days old, the average age being 53 days. It was decided that the pigs would be kept in their respective pens and runs for four weeks following weaning to permit the occurrence of evidence of infection in any pigs that were in the incubation stage of the disease at the time of weaning. This four-week postweaning period was extended to seven weeks because uninfected pigs were not available as expected for determining the transmissibility of brucellosis by natural contact exposure.

Blood was collected from the pigs 12 to 13 times during the suckling period and the seven weeks immediately following weaning. These collections were made at approximately weekly intervals, beginning when the pigs averaged 2 weeks of age. Demonstration of agglutinins in a blood serum dilution of 1:25 or higher or an isolation of *Br. suis* was considered evidence of infection.

After the Brucella status of each pig was ascertained, the infected pigs were removed to Brucella-free lots where they were grouped according to sex. At the same time, pigs of a similar age were obtained from a Brucella-free source and placed in contact with the infected pigs. Nine uninfected gilts were added to the lot of 7 infected females and only 1 uninfected boar was available for addition to the lot of 7 infected males. However, eight weeks after the first boar was added,

From the Animal Disease Station of the Pathological Division, Bureau of Animal Industry, Beltsville, Md.

4 more uninfected boars became available and were added to the group of infected males. Preexposure collections of blood for serum-agglutination tests and culture were made from all of the contact control animals and were found to be negative.

During contact exposure, weekly collections of blood were made from the infected and contact control animals for the first eight weeks, followed by monthly collections for the remainder of the experiment. All blood collections were tested for Brucella agglutinins and cultured for *Br. suis* organisms.

The pigs that showed no evidence of infection during the suckling and postweaning observation periods were classified as animals possibly having latent infection and were kept in their original isolation pens until sexually mature, at which time those of the same sex were placed in Brucella-free pens. They were autopsied at various ages of maturity. During this time, blood collections for serological and bacteriological studies were made at irregular intervals.

Group D consisted of 187 pigs farrowed by 31 sows. These animals were handled in the same manner as group C except for a few differences. All but 1 dam in group D were exposed to virulent *Br. suis* on the day of farrowing or within three days thereafter. This sow was exposed on the sixth day following farrowing. They were exposed by a single intravenous injection of virulent *Br. suis* organisms into the lateral ear vein. The number of viable organisms given to the sows varied from 4,600,000,000 to 12,233,333,333, the average dose being 10,151,111,111. Within fourteen days after exposure, all the sows had serum-agglutinin titers of 1:100 or higher. Further evidence of infection was shown by the isolation of Brucella from the genital excretions, milk, and/or blood collected from these sows during the time they suckled their pigs.

The suckling period of the litters varied from sixty-seven to eighty-five days, the average being seventy-seven days. After weaning, the pigs were kept in their respective farrowing pens for one month. Weekly collections of blood were made from pigs that sucked infected dams, beginning when they averaged 21 days of age and continuing until one month after weaning. At the end of this time, the Brucella status of these pigs was ascertained and those showing evidence of infection were removed to Brucella-free pens and grouped according to sex. Forty-nine pigs, of similar age and from a Brucella-free source, were added to the infected principals of the same sex to determine the transmissibility of brucellosis through natural contact exposure. Of the 49 uninfected pigs, 31 were gilts and 18 were boars. Serum-agglutination tests and cultural studies of blood collected from all contact controls at the time they were placed in pens with the principals were negative for Brucella. Following this time, blood was collected from both controls and principals at bi-weekly intervals for 11 collections and then monthly for four collections.

Colostrum and milk were collected aseptically from sows immediately following the intravenous injection of 2 ml. of anterior pituitrin. Mammary secretions and excretions from the genital tract were inoculated on sterile serum-potato infusion agar plates and incubated at 37 C. for five days. Plates were then observed for Brucella colonies. Portions of each specimen were also inoculated into guinea pigs. The guinea pigs were destroyed five weeks after inoculation at which time blood samples were collected for determining Brucella-agglutinin titers and spleens were cultured for Brucella organisms.

All blood was collected aseptically for bacteriological and serological studies in the manner described by Carle and Dewhirst.[1] Bacteriological and serological examinations were conducted on each collection of blood according to the procedure described by Manthei, *et al.*[2]

At the time of autopsy, all of the swine were examined for gross pathological lesions and localized areas of infection within the body were determined by direct culture of tissues. The tissues collected for culturing were body and visceral lymph glands, urogenital organs, spleen, and liver. Serological and bacteriological examinations were made on specimens of blood collected at the time of autopsy.

RESULTS

The percentage of infection was relatively high in both groups of pigs that sucked dams acutely infected with brucellosis.

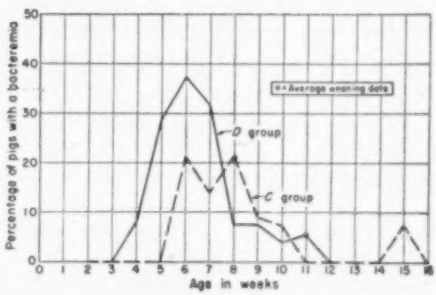

Fig. 1—Incidence of bacteremia in infected pigs during the suckling and weaning periods.

In group C, 14 of 57 of the pigs (24.5%) showed evidence of infection during the suckling period or the seven weeks immediately following weaning. Of 24 males and 32 females, 7 of each sex became infected.

In group D, 60 of 187 pigs (32%) showed evidence of infection during the suckling

period or within one month thereafter. Twenty-seven of 89 males became infected as compared with 33 of 98 females. The

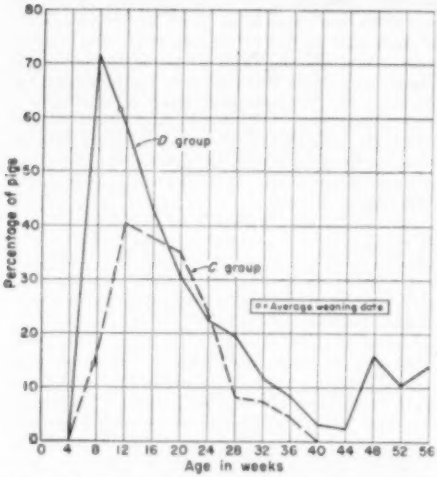

Fig. 2—Percentage of infected suckling and weanling pigs showing a blood serum-agglutinin titer of 1:25 or higher.

occurrence of a higher infection rate in the pigs of group D than of group C was associated with an earlier and longer exposure to *Br. suis*. The dams of group D were disseminating *Br. suis* organisms within a very short time after farrowing;

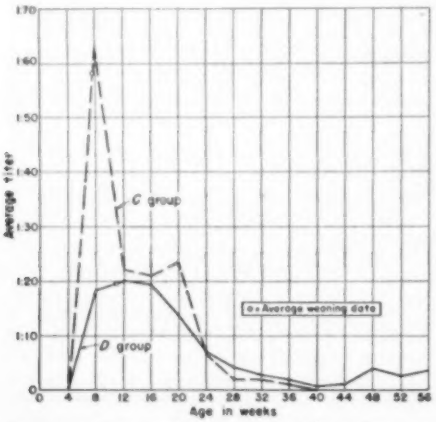

Fig. 3—Average blood serum-agglutinin titers in infected suckling and weanling pigs.

whereas, the majority of those in group C did not transmit infection until after re-exposure. Furthermore, the average suckling period was twenty-one days longer for the pigs in group D.

The highest incidence of bacteremia in the infected pigs of both groups is shown in figure 1. Pigs of group D showed blood stream infection at an earlier age than those of group C. Bacteremia was demonstrated in 1 pig of group D as early as 28 days of age and in 16 others between 30 and 40 days of age; whereas, the first isolations of Brucella were not made from the blood of pigs in group C until they were 42 days of age. Blood infection was not demonstrated in any of the pigs, except 1, after they were 77 days of age. The one exception, pig C-18, first showed a bacteremia forty-eight days after weaning or when 105 days old. This gilt was in contact with 2 infected and 4 uninfected litter mates during the suckling period and for seven weeks immediately following weaning.

A higher percentage of blood infection was demonstrated in boars than in gilts of both groups. Isolations of Brucella were made from the blood of 5 of 7 males and 3 of 7 female principals in group C during the suckling period or the seven weeks immediately following. These 8 pigs represent 14.4 per cent of the total number of pigs in group C, or 57 per cent of the principals. In group D, however, *Br. suis* was isolated from the blood of 19 of 27 males and 18 of 33 female principals during the suckling period. These 37 pigs represent 19 per cent of the total number of pigs in group D or 51 per cent of the principals.

The largest percentage of infected pigs having diagnostic agglutinin titers, as shown in figure 2, occurred when those in group C were 12 weeks of age and those of group D were 8 weeks of age.

The earlier occurrence of diagnostic titers and blood infection in group D than in group C was associated with an earlier and more severe exposure as the result of the nature of the disease in the dams.

The greatest percentage of infected pigs in group C developed diagnostic titers six weeks following the highest incidence of blood infection. However, in group D the highest percentage of infected pigs with diagnostic titers occurred only two weeks after the highest incidence of blood infec-

tion. Only a very small percentage of pigs showed diagnostic titers when they were 10 months old.

The appearance of a slight increase in percentage of animals of group D having diagnostic titers after the forty-fourth week was the result of a few reactions compared to a small number of animals from which blood was collected.

Average agglutinin titers of the infected pigs during four-week periods are shown in figure 3. This is presented to show only the general trend to the agglutinin response in the infected pigs. It is noted that the average agglutinin titers of infected pigs in group C were highest at approximately 8 weeks of age or one week after weaning, and in group D they were also highest one week after weaning but the pigs were 12 weeks of age. There was very little difference in the average titers of infected pigs in group D between the ages of 8 and 16 weeks. The agglutinin response was greatest two weeks after the highest point of bacteremia in group C and six weeks after that of group D. Only 4 of 45 pigs that had blood infection failed to develop agglutinin titers of 1:25 or higher. For detailed information concerning the effect of *Br. suis* infection on the blood of suckling and weanling pigs refer to tables 1 and 2.

The 14 principals of group C were autopsied at ages ranging from 5 to 22 months. Results of bacteriological and serological examinations of tissues at this time are given in tables 1 and 2. Localized infection was demonstrated in only 1 animal (C-15) at the time of autopsy. The isolation of *Br. suis* was made from the retropharyngeal lymph glands when this gilt was 5 months of age. The 60 principals in group D were autopsied at ages varying from 8 to 18 months. Bacteriological ex-

TABLE I—Brucellosis in Boars Naturally Infected as Suckling Pigs

Swine No.	Age of pigs at time of weaning (days)	Age of pigs at time of first serum agglutinin titer (days)	Routine Blood Examinations for Brucella Infection: Maximum Aggl. Titer: Serum dilution	Maximum Aggl. Titer: Age of pigs (days)	Bacteriology: Age of pigs at first Br. suis isolation (days)	Bacteriology: No. of Br. suis isolations	Bacteriology: Age of pigs at last Br. suis isolation (days)	Postmortem Examination: Bact. exam. for Br. suis	Postmortem Examination: Serum agglutinin titer	Postmortem Examination: Age of swine (mos.)
					Group C					
C-4	62	63	1:200	70	70	1	70	Neg.	-	8
C-27	57	72	1:25	72		0		"	-	20
C-28	57	77	1:50	77		0		"	-	21
C-41	49	56	1:100	56	49	2	56	"	-	21
C-45	47	55	1:50	55	55	1	55	"	-	20
C-46	47	55	1:50	55	42	1	42	"	-	22
C-49	47	47	1:50	55	42	3	62	"	-	22
					Group D					
D-2	84	55	1:100	55	55	1	55	Neg.	-	16.5
D-3	84	68	1:50	68	68	1	68	"	-	16
D-8	84	68	1:100	140	47	1	47	"	*	12
D-24	81	52	1:50	60	60	1	60	"	-	15
D-29	81	52	1:50	52		0		"	-	17
D-33	81	44	1:50	52	44	1	44	"	-	17
D-38	81	52	1:100	197	44	1	44	"	1:25	17
D-39	81	79	1:200	101	44	2	52	"	-	18
D-48	79	77	1:50	77		0		"	1:25	14
D-49	77	40	1:100	48	40	3	61	"	-	17
D-54	77	48	1:25	48		0		"	1:25	18
D-56	77	48	1:25	48		0		"	-	18
D-72	72	52	1:100	52	44	2	52	"	-	17
D-75	69	53	1:100	53	40	1	40	"	-	15
D-78	69	53	1:50	53		0		"	-	17
D-90	71	42	1:25	42		0		"	1:25	16
D-95	71	42	1:100	42		0		"	-	18
D-98	70		-		42	1	42	"	-	15
D-112	72		-		44	1	44	"	-	15
D-128	69	53	1:50	53		0		"	1:25	16
D-132	67	38	1:50	51	30	3	51	"	-	15
D-133	67	51	1:200	51	38	2	51	"	-	15
D-134	67		-		38	1	38	"	1:25	16
D-142	85	38	1:50	46	38	1	38	"	-	15
D-147	84	36	1:25	36	28	1	28	"	1:25	15
D-157	84	36	1:50	49	36	1	36	"	-	14
D-158	84	49	1:50	49	36	1	36	"	-	15

Aggl. = agglutinin; Bact. exam. = bacteriological examination; Neg. = no Brucella recoveries; — = no agglutination in the 1:25 or higher; * = no specimens were collected for bacteriological or serological examination.

aminations of body tissues revealed no areas of localized Brucella infection in any of the pigs. Only 18 of 66 pigs in both groups had serum-agglutinin titers as high as 1:25. No blood was collected at this time from 8 pigs that had died.

The course of *Br. suis* infection in individual pigs of groups C and D is outlined in tables 1 and 2.

Factors such as the steady decline of agglutinin titers and number of pigs showing diagnostic titers, a rapid decline of blood infection, and failure to isolate *Br. suis* from body tissues of pigs older than 5 months indicate that pigs infected at an early age have a tendency to recover from brucellosis before maturity.

The male control animals that were subjected to natural contact exposure to the male principals of group C were exposed for periods ranging from sixty-four to seventy-nine weeks, the average exposure time being sixty-eight weeks. During this time, bacteriological and serological examinations of the blood of each animal did not reveal any evidence of spread of *Br. suis* from the principals to the controls. Body tissues and blood were also negative for *Br. suis* at the time of autopsy.

The female controls of this group were exposed from six to thirty-six weeks, or an average of twenty-three weeks. During the period of exposure, all but 1 animal (C-7900) developed diagnostic serum-agglutinin titers, none of which exceeded 1:50. *Brucella suis* was isolated from the blood of 1 gilt on the twenty-seventh day of exposure. Further indications of spread of brucellosis by contact exposure was demonstrated in 3 other gilts at the time

TABLE 2—Brucellosis in Sows Naturally Infected as Suckling Pigs

			Routine Blood Examinations for Brucella Infection					Postmortem Examination		
			Maximum Aggl. Titer		Bacteriology					
Swine No.	Age of pigs at time of weaning (days)	Age of pigs at time of first serum agglutinin titer (days)	Serum dilution	Age of pigs (days)	Age of pigs at first Br. suis isolation (days)	No. of Br. suis isolations	Age of pigs at last Br. suis isolation (days)	Bact. exam. for Br. suis	Serum agglutinin titer	Age of swine (mos.)
					Group C					
C-15	57	105	1:100	105		0		Pos.	*	5
C-18	57	105	1:100	105	105	1	105	*	*	5
C-20	57	85	1:200	105		0		*	*	5
C-29	57	65	1:50	65		0		Neg.	*	5
C-39	50	77	1:25	77	57	1	57	"	—	10
C-43	48	48	1:25	48		0		"	*	5
C-47	48	48	1:25	48	42	1	42	"	—	10
					Group D					
D-4	84	68	1:25	68	34	1	34	Neg.	1:25	13
D-6	84	104	1:25	104	34	1	34	"	1:25	14
D-9	84	68	1:25	68	47	1	47	"	—	14
D-13	81	46	1:50	54		0		"	1:25	16
D-25	81	52	1:25	52		0		"	—	16
D-27	81	52	1:25	52	52	1	52	"	—	14
D-28	81	79	1:25	79		0		"	—	13
D-32	81	44	1:25	44		0		"	1:25	18
D-44	79	135	1:25	135	77	1	77	"	1:25	14
D-50	77	40	1:50	48		0		"	1:25	16
D-51	77	48	1:50	48	48	1	48	"	—	14
D-52	77	40	1:100	145	40	2	48	"	—	14
D-53	77	48	1:100	48	48	1	48	"	1:25	14
D-62	73	44	1:25	44		0		"	—	17
D-68	72				36	2	44	"	—	13
D-77	69	40	1:100	53	40	1	40	"	—	13
D-89	71	55	1:25	55		0		"	*	18
D-96	71				34	1	34	"	—	13
D-106	69	40	1:50	48	32	3	48	"	*	8
D-108	69	67	1:50	67		0		"	—	14
D-114	72	44	1:50	44	44	1	44	"	—	14
D-115	72	57	1:100	57		0		"	1:25	14
D-117	67	38	1:25	38	38	1	38	"	1:25	13
D-122	67	46	1:100	46		0		"	—	13
D-127	69	40	1:50	89	32	2	40	"	1:25	13
D-137	67	38	1:50	38		0		"	—	16
D-143	85	38	1:50	38		0		"	—	13
D-149	84				44	2	63	"	—	12
D-151	84	36	1:200	85	36	2	49	"	—	13
D-152	84	49	1:100	85	49	1	49	"	—	13
D-153	84	49	1:50	49		0		"	1:25	15
D-154	84	106	1:50	106		0		"	—	17
D-155	84	36	1:25	36		0		"	—	17

Aggl. = agglutinin; Bact. exam. = bacteriological examination; Pos. = Brucella recoveries; Neg. = no Brucella recoveries; * = no specimens were collected for bacteriological or serological examination; — = no agglutination in the 1:25 dilution or higher.

of autopsy. *Brucella suis* was isolated from the submaxillary lymph glands of 2 gilts and from the submaxillary and prescapular lymph glands and spleen of 1 other gilt. Two of these animals were found dead, consequently no blood was collected at the time of autopsy.

The 18 male control animals of group D were exposed forty-two to fifty-eight weeks, the average exposure being forty-nine weeks. Bacteremia was not demonstrated in any of these pigs and only 2 (11%) developed diagnostic agglutinin titers. At the time of autopsy, the animals varied from 60 to 79 weeks of age or an average of 68 weeks. Five of the 18 (27.7%) of these controls had serum-agglutinin titers of 1:25 or higher. Tissue and blood cultures of these animals were negative for Brucella.

The female controls of group D were exposed 32 to 59 weeks or an average of 45 weeks. Eight (25.8%) of the 31 female controls had serum-agglutinin titers that did not exceed 1:50 during the exposure period; however, no isolations of Brucella were made from the blood. At the time of autopsy, 9 (29%) of these animals had diagnostic serum-agglutinin titers. Bacteriological examinations of tissues and blood were negative for Brucella. Failure to isolate *Br. suis* and absence of persistent agglutinin titers in the controls indicate that they received a light exposure from the infected pigs in group D.

For further information on the transmission of brucellosis from infected to uninfected pigs, see tables 3 and 4.

There were 170 pigs in groups C and D that sucked infected dams yet showed no evidence of infection during the suckling and immediate postweaning periods. These animals were retained for further studies to determine the possibility of latent infection. Blood was collected at irregular intervals until the time of autopsy, when the pigs were 1 to 22 months of age. At the time of autopsy, blood was collected from all except 4 animals that had died.

Fifteen of 170 pigs in group C and D showed evidence of latent infection following the immediate postweaning period. All but 3 of the 15 pigs had infected litter mates. Agglutinin titers of 1:25 or 1:50 were demonstrated in 10, and *Br. suis* was isolated from the blood or body tissues of 7.

TABLE 3—Results of Exposing Brucella-Free Weanling Boars to Infected Weanling Boars

Swine No.	Age at beginning of exposure	Examination of Blood: First Aggl. Titer, Serum dilution	First Aggl. Titer, Length of exposure	Maximum Aggl. Titer, Serum dilution	Maximum Aggl. Titer, Length of exposure	Postmortem Examination: Bact. exam. for Brucella	Serum agglutinin titer	Age of swine
				Group C				
C-8112	Approx. 25 wks.			–	65 wks.	Neg.	–	90 wks.
C-8121	" 20 "			–	79 "	"	–	99 "
C-8136	" 25 "			–	70 "	"	–	95 "
C-8031	" 25 "			–	64 "	"	–	89 "
C-8051	" 25 "			–	64 "	"	–	89 "
				Group D				
D-190	15-20 wks.				46 wks.	Neg.	–	64 wks.
D-192	"	1:25	239 days	1:25	239 days	"	1:25	68 "
D-199	"			–	50 wks.	"	–	68 "
D-200	"			–	50 "	"	–	68 "
D-205	"			–	50 "	"	–	68 "
D-209	"			–	50 "	"	–	69 "
D-212	"			–	58 "	"	–	76 "
D-214	"			–	48 "	"	–	68 "
D-215	"			–	43 "	"	–	63 "
D-217	"			–	46 "	"	1:25	66 "
D-218	"			–	67 "	"	–	65 "
D-222	"	1:50	13 days	1:50	13 days	"	–	75 "
D-226	"			–	49 wks.	"	–	64 "
D-227	"			–	48 "	"	–	68 "
D-230	"			–	56 "	"	1:25	71 "
D-231	"			–	61 "	"	1:25	76 "
D-236	"			–	42 "	"	–	60 "
D-237	"			–	43 "	"	1:50	63 "

Aggl. = agglutinin; Bact. exam. = bacteriological examination; — = no agglutination in the 1:25 dilution or higher; Neg. = no Brucella recoveries.

All but 1 of the 7 pigs were between the ages of 4 and 7 months at the time Brucella was isolated. The course of brucellosis in these animals was not unlike that observed in litter mates that showed evidence of infection during the suckling and immediate postweaning periods.

At no time was Brucella isolated from the blood of 25 females and 18 males of group C. One male had a single titer of 1:25 at the age of 7 months and was negative at autopsy. One female pig had a single serum-agglutinin titer of 1:25 at 5 months of age and was negative when autopsied at 12 months of age. Two other females that previously showed titers also had titers of 1:25 when autopsied at 4 months of age. *Brucella suis* was isolated from the retropharyngeal lymph glands of 1 female when autopsied at the age of 20 months. This animal had shown no evidence of infection prior to this time.

In group D, 127 pigs were studied for possible latent infection. Of this number, 65 were females and 62 were males. Only 2 gilts and 4 boars developed diagnostic

TABLE 4—Results of Exposing Brucella-Free Weanling Sows to Infected Weanling Sows

Swine No.	Age at Beginning of exposure 12-22-49	Examination of Blood: First Aggl. Titer — Serum dilution	First Aggl. Titer — Length of exposure	Maximum Aggl. Titer — Serum dilution	Maximum Aggl. Titer — Length of exposure	Postmortem Examination: Bact. exam. for Brucella	Postmortem Examination: Serum agglutinin titer	Age of swine
				Group C				
C-7848	15-20 wks.	1:50	27 days	1:50	27 days	Pos.	*	28 wks.
C-7865	"	1:50	27 "	1:50	27 "	Neg.	*	24 "
C-7866	"	1:25	52 "	1:25	52 "	Pos.	*	24 "
C-7869	"	1:50	52 "	1:50	52 "	*	*	56 "
C-7900	"			-	35 wks.	Pos.	-	55 "
C-8021-S	"	1:25	27 days	1:25	27 days	Neg.	1:25	25 "
C-8125	"	1:25	47 "	1:25	47 "	"	-	48 "
C-8126	"	1:25	42 "	1:25	42 "	"	-	48 "
C-8129	"	1:25	42 "	1:25	42 "	"	-	54 "
				Group D				
D-188	15-20 wks.			-	38 wks.	Neg.	-	58 wks.
D-189	"			-	59 "	"	-	76 "
D-191	"			-	39 "	"	-	57 "
D-193	"	1:25	239 days	1:25	239 days	"	1:50	61 "
D-194	"			-	34 wks.	"	-	54 "
D-195	"			-	32 "	"	1:25	50 "
D-196	"			-	37 "	"	1:25	67 "
D-197	"			-	37 "	"	-	54 "
D-198	"			-	49 "	"	-	66 "
D-201	"			-	36 "	"	-	56 "
D-202	"	1:25	123 "	1:25	123 days	"	1:50	70 "
D-203	"	1:25	88 "	1:25	88 "	"	-	57 "
D-204	"			-	41 wks.	"	-	61 "
D-206	"			-	41 "	"	-	61 "
D-207	"	1:25	207 "	1:25	207 days	"	1:25	56 "
D-208	"			-	58 wks.	"	-	76 "
D-210	"	1:50	88 "	1:50	88 days	"	-	56 "
D-211	"	1:25	172 "	1:25	172 "	"	-	60 "
D-213	"			-	52 "	"	-	68 "
D-216	"			-	36 "	"	-	54 "
D-219	"			-	57 wks.	"	-	75 "
D-220	"	1:25	88 "	1:25	88 days	"	-	55 "
D-221	"			-	74 wks.	*	*	81 "
D-223	"			-	36 "	Neg.	1:25	56 "
D-224	"			-	37 "	"	-	55 "
D-225	"			-	60 "	"	1:25	76 "
D-228	"			-	62 "	"	-	77 "
D-229	"	1:25	207 "	1:25	207 days	"	1:25	57 "
D-232	"			-	37 wks.	"	1:25	57 "
D-233	"			-	54 "	*	*	71 "
D-235	"			-	39 "	Neg.	-	56 "

Aggl. = agglutinin; Bact. exam. = bacteriological examination; Pos. = Brucella recoveries; Neg. = no Brucella recoveries; * = no specimens were collected for bacteriological or serological examination; — = no agglutination in the 1:25 dilution or higher.

serum-agglutinin titers after the immediate postweaning period. All of these first showed titers at approximately 5 months of age, except 1 boar which was 9 months old. None of the titers were higher than 1:50. *Brucella suis* was isolated from 4 gilts and 2 boars. The only isolation from 1 gilt, was from the blood two weeks prior to autopsy. This gilt had a titer of 1:50, both at the time of the bacteremia and autopsy. The other isolations of *Br. suis* were made from the submaxillary lymph glands of 4 pigs and from the submaxillary and retropharyngeal lymph glands of the remaining animal. Only 1 of these 5 had an agglutinin titer as high as 1:25.

DISCUSSION

The percentage of pigs that developed brucellosis from sucking dams with acute *Br. suis* infection was relatively high and was similar to the percentage of pigs that were infected from sucking dams with subacute brucellosis in a previous experiment[2] at this laboratory. However, no significant difference in susceptibility of the sexes was observed in groups C and D.

Weaning age of pigs that sucked dams with acute brucellosis had little or no influence on the percentage that showed evidence of infection. Most of the pigs in groups C and D had developed Brucella agglutinins or blood infection by the time they were 8 weeks old. Although the pigs in group D were weaned at approximately the same age as those in groups A and B reported in the preceding paper,[2] bacteremias were less prevalent and agglutinin titers receded more rapidly after weaning.

The course of brucellosis in suckling and weanling pigs appears to be more closely associated with the character of the disease in dams than with other factors. Pigs that received intensive exposure to *Br. suis* at an early age showed evidence of infection sooner than those that received a moderate or light exposure. Suckling pigs that became infected before 8 weeks of age had a tendency to recover more rapidly than those that first showed evidence of infection between 8 and 12 weeks of age.

The ability of weanling pigs, infected during suckling period, to transmit brucellosis to susceptible pigs of the same age and sex was definitely established. This occurred in the pigs of group C which averaged 56 days of age at the time of weaning. These results confirm preliminary evidence[2] that indicated brucellosis was transmitted from infected to susceptible weanling pigs.

It has been definitely established that latent infection existed in suckling and weanling pigs that sucked infected dams. Our inability to diagnose brucellosis in these animals prior to the immediate postweaning period permits them to be placed in a Brucella-free environment with nonreacting, uninfected pigs of the same age. As a result, clean premises become contaminated and uninfected pigs are exposed to brucellosis. This may be the cause of unexplained outbreaks in some swine herds.

The agglutination test identified 42 of 52 pigs in groups C and D, and 23 of 25 pigs in groups A and B[2] from which *Br. suis* was isolated. Brucella agglutinins were demonstrated in the 65 pigs and *Br. suis* was isolated from all but 1 of 77 by the time they were 6 months old. All of these pigs had sucked infected dams.

Although the agglutination test will not identify all of the infected pigs at the time they are weaned and placed in Brucella-free environment, removal of all animals showing titers of 1:25 or higher will hold exposure of uninfected pigs to a minimum. Exposure to infection can be further minimized by testing the pigs each month until they are 6 months of age, with prompt removal of reactors as they occur.

All of the evidence accumulated from research on this problem indicates that the recovery from brucellosis of a large majority of suckling and weanling pigs before they reach sexual maturity is also responsible for the success attained in controlling swine brucellosis by replacing infected herds with their progeny.

SUMMARY

The percentage of pigs in each of two groups that showed evidence of Brucella infection during the suckling and immediate postweaning periods was similar. There was no significant difference in the susceptibility of boars and gilts that sucked dams with acute *Brucella suis* infection.

The highest incidence of bacteremia in infected suckling pigs occurred when the pigs were 42 days of age. However, isolations of *Br. suis* were made from the blood of one pig as early as twenty-eight days, and from another as late as 105 days,

after birth. Bacteremia was demonstrated in 24 of 34 males and 21 of 40 females infected as suckling pigs.

The largest percentage of infected pigs having blood serum-agglutinin titers of 1:25 or higher occurred when they were between the ages of 8 and 12 weeks. Maximum titers also occurred when these pigs were 8 to 12 weeks of age. These titers had receded and disappeared by the time most of the pigs were 4 months of age.

Localized infection was demonstrated at the time of autopsy in only 1 of the 74 pigs that showed evidence of infection during the suckling and immediate postweaning periods. *Brucella suis* was isolated from the retropharyngeal lymph glands when this gilt was 5 months old.

Brucellosis was transmitted from infected to uninfected weanling pigs of the same age and sex by natural exposure.

Evidence of latent infection was demonstrated in 15 of 170 pigs that did not show any evidence of brucellosis during the suckling and immediate postweaning periods. All of these pigs had sucked infected dams. Of the 15 pigs, 10 developed diagnostic agglutinin titers and *Br. suis* was isolated from 7, 5 of which never showed a titer. Twelve of these 15 pigs had infected litter mates.

In only one instance was *Br. suis* isolated from pigs older than 7 months of age and which had sucked infected dams. *Brucella suis* was isolated from the retropharyngeal lymph glands of the one exception at the time of autopsy, when this sow was 20 months old. There had been previous evidence of infection in this animal.

References

[1]Carle, B. N., and Dewhirst, Wm. H., Jr.: A Method for Bleeding Swine. J.A.V.M.A., *101*, (1942): 495-496.

[2]Manthei, C. A., Mingle, C. K., and Carter, R. W.: *Brucella Suis* Infection in Suckling and Weanling pigs. I. J.A.V.M.A., *121*, (1952): 373-382.

Hydrotherapy Treatment of Bovine Mastitis

Some investigational work on hydrotherapy treatment of bovine mastitis was started in Florida in June, 1952, under the supervision of Dr. A. A. McMurray of the Mastitis Control Division of the Florida Livestock Sanitary Board. The data are insufficient for definite conclusions but are quite favorable.

The treatment is administered by a device made of metal that fits around the infected quarters. A hose, from a pressure spigot, forces water through a special valve, causing a swirl around the infected quarter. The water then flows over the upper rim of this device and drains away.

Just before and after each treatment, the quarter is stripped out. Treatments are twelve hours apart and of fifteen minutes duration. The results are as follows:

Group 1.—Seven quarters were treated for acute staphylococcic mastitis. After four to six treatments infective organisms were absent, inflammation subsided, and milk returned to a normal physical appearance.

Group 2.—Four quarters, showing excessive leukocytes but no bacteria, were treated for chronic mastitis. After six treatments there was a definite improvement in three quarters. Milk returned to a normal leukocyte content and physical appearance, tissues were more pliable, and secretion of the mammary glands was stimulated.

Group 3.—Ten quarters were treated for chronic *Streptococcus agalactiae* mastitis. After eight treatments, all showed a definite improvement. Milk returned to a normal, physical appearance, leukocytes were greatly reduced, quarters were more pliable, but indurated areas were more pronounced and definitely circumscribed. In most cases milk secretion was increased. However, *Streptococcus agalactia* were still present.

Group 4.—Only 1 case of chronic *Streptococcus agalactia* mastitis was treated by using penicillin in conjunction with hydrotherapy. This quarter showed negative bacterial infection on two subsequent laboratory examinations. Further extensive work will be carried out on similar cases.

Group 5.—Three highly acute cases were given hydrotherapy treatment. After five treatments at twelve-hour intervals with 57 F. water, milk was normal and inflammation subsided. No laboratory service was available.

An Interesting Observation.—Even though the infected quarter had been thoroughly milked out just prior to treatment, ½ pt. to 1 qt. of milk, depending on the individual case, could be taken from the same quarter immediately following a fifteen-minute exposure to the swirling water. The quarter probably was thoroughly stimulated and then relaxed, permitting the stripping out of all its removable contents. The udder was then more pliable on palpation, and the indurated areas were more readily detected This investigational work is being continued.

Is Age a Factor or a Coincidence in Ketosis and Milk Fever?

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IT IS TOO seldom that accurate data of herd health are available and, because of this, it is probably too often that man's not infallible memory has to substitute for factual information. The following analysis, though insufficient for statistical approach, does include information which is based on herd records. It covers a period of about four and one-half years and a total of 632 records of different milking animals.

The 632 records represent two groups. As of June, 1951, 301 animals were in the herd. While some of these had been in the herd for the entire period, many had been added during the period and, therefore, were present in the herd for various times shorter than four and one-half years. The second group contains records of 331 animals which had been in the herd for various lengths of time during the period but had been sold or otherwise disposed of before June, 1951. A total of 23 records of ketosis and 21 of milk fever were encountered in the histories of the 632 animals for the period mentioned.

The prevalence of each disease among both groups was arbitrarily charted on a yearly basis (table 1). The figures obtained, however, can not be compared with each other because the total number of animals varied not only between years, but between even much shorter periods. About all one can say is that each figure represents the number of cases occurring on the farm during the year mentioned. The total of 44 cases of ketosis and milk fever occurred in only 33 different animals. Fifteen had ketosis once; 9 had milk fever once; 2 had both; 2 had ketosis twice; 3 had milk fever twice; and 2 had ketosis once and milk fever twice. Ketosis occurred an average of 22.7 days, and milk fever 1.7 days, following calving. The average age of animals attacked was 6.7 years (range 2-11 years) for ketosis and 8.7 years (range 6-11 years) for milk fever. The approximate average production per lactation of the ketosis cases was 10,800 lb. of milk and 400 lb. of butterfat; of the milk fever cases, 8,650 lb. of milk and 350 lb. of butterfat.

TABLE 1 — Number of Cases in Animals on Hand as of June, 1951 (301)

	1947	1948	1949	1950	To June 1951	Totals
Ketosis	0	0	0	5	9	14
Milk Fever	1	2	3	3	0	9
					Total	23
Number of Cases in Animals Eliminated During Same Period (331)						
Ketosis	3	1	3	2	0	9
Milk Fever	8	1	2	0	1	12
					Total	21

A simple relation of age of attack to number of cases, although of no help in estimating prevalence, did suggest an uneven age group distribution (table 2). Since it was known that a policy of raising replacements had been established in this herd a few years back and that there still remained in the herd as of June, 1951, some of the animals of the older herd, the records of these animals were divided into one group representing 260 raised replacements and a second group representing 41 cows of the old herd. The average age of the replacement group as of June, 1951, was 4.4 years (range 2-9 years) and of the older group 9.7 years (range 7-15 years with 13 unknown). Only 10 of the 260 were more than 7 years old and only 4 of the 41 under 9 years of age.

The average age of attack of ketosis in the younger group was 5.9 years; in the older group, 9 years. In the older group, the average age of attack of milk fever was 8.7 years. Ten (70%) of the ketosis cases and none of the milk fever cases were found in the records of the 260 replacements. Four (30%) of the ketosis cases and all of the milk fever cases were found in the records of the 41 older ani-

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mals. One might theorize that 10 cases of ketosis in the 260 animals and 4 in the group of 41 animals represent incidences of about 4 per cent and 10 per cent, respectively, for the four and one-half years, or 0.9 per cent and 2.2 per cent, annually.

TABLE 2 — Relation of Age of Attack to Prevalence

Age (years)	Ketosis	Milk fever
2	1	0
3	1	0
4	2	0
5	5*	0
6	2	1
7	1	2
8	4*	6
9	3	5
10	1	2
11	2	3
Age unknown	1	3
Totals	23	21

*Possible uneven age group distribution.

Again, however, not all animals were present in the herd for the entire period and such a percentage would, therefore, not represent the number of cases occurring in a fixed number of animals for a fixed time. In herds with frequently shifting populations, some other means of determining incidence of disease is necessary.

It would appear, on the surface, that there was more milk fever and, to a less extent, more ketosis associated with the older animals. However, there are other circumstances which must be considered and which might well lead one to feel that age as such, along with other factors, may be coincidental and not causal.

First, older animals retained in a herd are usually selected for high production based on past performance. Younger animals may also be selected for high production, but if they are first-calf heifers, records of past production are unavailable. If they are in their first few lactation periods, records of past production are still not as complete as in older animals. The highest producers are usually retained the longest, if such is possible. Thus, production associated with selection may be more important than age as such.

Second, the feeding and management of this herd was better than average. Grass silage had been used more extensively in this herd than in most others, particularly in 1950 and 1951. In 1951, roughage was almost exclusively good grass silage the year around. The percentage of protein in the grain ration was reduced to about 13 per cent sometime in 1951. One might postulate that this change in feeding was associated with an increase in ketosis and decrease in milk fever. Here again, one must consider that (1) the number of cases per year is not related to the same total number of animals each year for the entire year; (2) a total of 44 cases of ketosis and milk fever in 33 out of 632 cows over a period of four and one-half years is not a high prevalence; (3) 5 of the 9 cases of ketosis in the spring of 1951 occurred within about a week's time, followed by a return to the usual low prevalence; (4) carbohydrate loss in silage was probably compensated for by lowering the percentage of protein in the grain ration; (5) a probable uneven age group distribution existed; (6) selection for production may be a prevailing factor; and (7) other unknown factors may be present.

SUMMARY

Despite the inadequacy of numbers for statistical approach, these data would appear to support the belief that milk fever is essentially a disease occurring in older animals, although age as such may be more coincidental than causal. These data would seem to support the belief that ketosis may occur in any age group, but possibly occurs more frequently in those older groups selected to be retained in the herd. Despite the increase in the total number of cases of ketosis occurring during the period of extensive feeding of grass silage, a conclusion that the feeding of grass silage *per se* in this herd increased the prevalence of ketosis would appear to be presumptuous.

Lindane for Lice.—Lindane applied as a dust or as a vapor easily and effectively controls the body louse, the shaft louse, and the fluff louse of chickens. Dust is applied to the litter, or nest, or beneath the roosts. One application will keep flocks free of lice for as long as three months. Used as a vapor, it worked as effectively but more slowly.—*World's Poult. Sci. J., July, 1952.*

Horses, hamsters, and guinea pigs can sometimes be mildly infected with vesicular exanthema by artificial inoculation.—*M. L. Johnson, D.V.M., Kansas.*

The Therapeutic Efficiency of Furacin® and Furacin-Penicillin Mixture for Mastitis Caused by Streptococcus Agalactiae

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MIRES[1] OBTAINED a high percentage of clinical cures in both acute and chronic cases of bovine mastitis by the use of 25 cc. of furacin per quarter.

Kakavas, *et al.*[2] reported a high percentage of cures in bovine mastitis, caused by Streptococcus, Staphylococcus, Escherichia, and Pseudomonas, from three daily infusions of a furacin-penicillin mixture.

Mires[3] in a further report was able to obtain a higher percentage of bovine mastitis cures with a furacin-penicillin mixture than with furacin alone. In the same report, Mires discusses the *in vitro* synergistic activity of a furacin-penicillin solution.

This paper describes additional critical experimentation with furacin and a furacin-penicillin mixture for treating mastitis caused by *Streptococcus agalactiae*.

MATERIALS AND METHODS

All the experimental herds used for the field trial evaluation of furacin, furacin-penicillin, and penicillin were in the immediate area of Madison, Wis. The herds were maintained under average dairy farm conditions and had numerous cases of mastitis. Each herd was evaluated by individual quarter milk samples utilizing the Hotis test, direct microscopic film of incubated samples, and by streaking each incubated sample upon a blood-agar medium containing sodium azide, 1:10,000 and mannitol, 1:200. The infected quarters of each herd were grouped to permit comparative therapy of quarters similar in nature and extent of involvement. The infected quarters were treated once and milk samples from each quarter were obtained at the three subsequent weekly intervals and were evaluated by the same procedures. A quarter was considered free of *Str. agalactiae* if it was negative to each of three consecutive weekly post-treatment tests. Five different herds of dairy cattle, representing a total of 238 infected quarters of 147 cows, were utilized in the trials listed in experiments 1 and 2. The prevalence of infection was approximately 40 per cent.

RESULTS

Experiment 1, Furacin Solution Compared with Penicillin.—Group A received 100,000 units of crystalline G penicillin, potassium salt, in 10 ml. of penicle,®* water-in-oil type of vehicles. Group B was given 40 ml. of furacin solution containing 0.2 per cent nitrofurazone N.N.R. in a water-miscible vehicle.

The results of experiment 1 are tabulated in table 1.

TABLE 1—Results of Therapy of Penicillin and Furacin Solution in Bovine Mastitis Caused by Streptococcus Agalactiae

Group	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
A	56	44	78.5
B	56	29	51.8

The statistical evaluation of the results of therapy in experiment 1 revealed that, under the conditions of the trial, 40 ml. of furacin solution was inferior to 100,000 units of penicillin in a water-in-oil vehicle for the treatment of mastitis caused by *Str. agalactiae*. (Chi-Square=8.85 (1 d.f.) or $P < .01$ where P is the probability of obtaining a value of chi-square greater than that obtained when there is no treatment difference.)

Experiment 2, Furacin-Penicillin Mixture Compared with Penicillin.—Group A was given 100,000 units of crystalline G penicillin, potassium salt, in 10 ml. of penicle, water-in-oil emulsion. Group B received 40 ml. of furacin solution to which had been added 100,000 units of crystalline G penicillin, potassium salt.

The results of this experiment are tabulated in table 2.

The statistical evaluation of this trial demonstrated no significant difference therapeutically between 100,000 units of crystalline G penicillin, potassium salt, and a

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Furacin-veterinary is a product of Eaton Laboratories, Inc., Norwich, N. Y.

*Penicle,® water-in-oil type of vehicle, Wallace Laboratories Inc., New York, distributors.

penicillin-furacin mixture for *Str. agalactiae* mastitis. (Chi-square = 2.21 (1 d.f.) or .2> P > .1 for P as in experiment 1.)

TABLE 2—Summary of Results of Penicillin and Penicillin-Furacin Solution for Bovine Mastitis Caused by Streptococcus Agalactiae

Group	Quarters treated (No.)	Quarters freed of infection (No.)	(%)
A	62	41	66.1
B	64	34	53.1

DISCUSSION

It is recognized that the numbers of quarters treated in these experiments are considerably fewer than those in the trials of Mires.[1,3] It is possible also that the quarters subjected to therapeutic trial in our experiments may have represented the more difficult cases fom the standpoint of chronicity and prevalence of infection in the herds. Certainly, it is well known that unsupervised treatment by the owners is practiced quite frequently and that the more refractory cases of streptococcic mastitis persist as "problem" cases. Nevertheless, the medicaments used in these trials were tested under comparable conditions, and perhaps in the final analysis the efficacy of any drug should be subjected to critical comparative evaluation.

The results of therapy against *Str. agalactiae* with the methods utilized in these experiments indicate that 40 ml. of furacin solution is less effective than 100,000 units of penicillin in a retention vehicle. Furthermore, a synergistic action *in vivo* between penicillin and furacin solution was not demonstrated. Since mastitis caused by *Str. agalactiae* is the most prevalent in this area, an evaluation of the therapeutic efficacy of furacin for other types of mastitis could not be obtained. As far as could be determined by clinical examination and by interrogation of dairymen, the furacin solution is apparently well-tolerated by the mammary gland. Laboratory irritability trials were not completed.

SUMMARY

1) It was found that 100,000 units of crystalline G penicillin, potassium salt, in 10 ml. of penicle, a water-in-oil type vehicle, was superior to 40 ml. of furacin solution for the treatment of *Streptococcus agalactiae* mastitis.

2) A mixture of 40 ml. of furacin solution and 100,000 units of crystalline G penicillin, potassium salt, was not superior to 100,000 units of crystalline G penicillin, potassium salt, in 10 ml. of penicle for the treatment of *Str. agalactiae* mastitis.

3) A synergistic action *in vivo* between furacin and penicillin was not demonstrable.

References

[1]Mires, M. H.: Nitrofurazone—A Practical Antibacterial Agent for Bovine Mastitis. J.A.V.M.A., *117*, (1950): 49-51.

[2]Kakavas, J. C., Roberts, H. D. B., de Courcy, S. J., and Ewing, D. L.: Chemotherapy of Bovine Mastitis with Furacin and Penicillin Mixture. J.A.V.M.A., *119*, (1951): 203-207.

[3]Mires, M. H.: Nitrofurazone with Penicillin in Bovine Mastitis. The Goshen Practitioner. Fall, (1951): 1-2.

Fifty Canine Distemper Immunizations Using Avianized Virus Clinically

O. A. LÓPEZ-PACHECO, D.V.M.

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Fifty dogs were immunized against canine distemper during a ten-month period by the writer at the Hospital para Animales López Díaz at Hato Rey, P. R. The vaccine used was canine distemper virus (modified) (chicken embryo origin—vacuum dried) avianized.* The vaccine was used according to the directions of the manufacturer.

The breeds of dogs vaccinated were various. Among them were German Shepherds, Cocker Spaniels, Fox Terriers, German Boxers, Doberman Pinschers, mongrels, etc. Their age ranged from 5 weeks to 12 years old. Six out of the total of 50 dogs vaccinated were over 1 year of age. Though the dogs vaccinated were not sick animals, some of them were not in a good state of nutrition, some exhibiting pustules on the skin of the inner thighs and abdomen, and about 25 of them (50% of the total number vaccinated) were heavily infested with internal parasites—ascarids and hookworms.

It is generally considered good practice to delay distemper vaccination until the dog is parasite-free and in a good state of nutrition. However, dogs in this condition

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*Manufactured by Lederle Laboratories Division, American Cyanamid Co., New York, N. Y.

are more likely to develop a severe course of distemper. It would seem more important then to establish immunity as quickly as possible.

Since no fever or diarrhea was present, these subjects were vaccinated and proper treatment in the line of tonics, balanced high protein ration, and adequate vermifuges was instituted. Success resulted in all these cases, with no untoward reactions after the vaccine was injected.

No dogs with symptoms that could lead us to suspect an incipient stage of canine distemper were vaccinated.

Vaccination of dogs that had received canine distemper antiserum was not undertaken until after two weeks had elapsed since the last injection.

All 50 dogs vaccinated were examined at least twice subsequently at intervals of ten to twenty days and no symptoms of illness were seen that could have been ascribed as a severe reaction of the vaccine.

To determine if any of the dogs were exposed to distemper, a follow-up was made six months after vaccination. It was highly probable that most of the vaccinated dogs came in contact with distemper-infected animals. However, none of these dogs developed any signs of distemper.

Although a few of the dogs may have been distemper-immune at the time of vaccination, the majority undoubtedly were distemper-susceptible.

The method of administration of the injection was subcutaneous, and the site was the region over the ribs just back of the elbow after suitable preparation of the area by clipping and using an antiseptic.

Syringes were sterilized only by boiling.

Conclusions.—This canine distemper vaccine (avianized), in my opinion, seems to be, so far, the vaccine long sought by the veterinary practitioner—a combination of high immunity, ease of administration, innocuousness, and low cost.

The vaccination of dogs against distemper with this vaccine is facilitated by those factors enumerated. Particularly the fact that it is not necessary for the dog owner to return the dog for another visit to the veterinarian except in very special cases in which the condition of the dog requires it.

Thiamine for Bracken-Poisoned Horses

Six of 7 horses suffering with bracken poisoning (*Pteridium latinusculum*) recovered quite promptly when liberal doses of thiamine hydrochloride were given intravenously (*Canad. J. Comp. Med., 15,* 1951). One case of supposed poisoning in a 6-month-old heifer also responded to thiamine treatment.—*Vet. Bull., July, 1952.*

Also see the JOURNAL (July, 1952:9-13) for further information on bracken fern poisoning.—ED.

Toxaphene

One of the newer insecticides, toxaphene, is reported to be poisonous for certain animals, especially dogs. It is a slow-acting contact and stomach poison for insects. Poisoning of animals may be caused by its absorption through the skin or its ingestion over a considerable period of time.

In human poisonings, the symptoms are salivation, emesis, convulsions, and death usually within twenty-four hours. Treatment should be directed toward evacuation of the stomach and bowels. Oily cathartics are contraindicated since they seem to increase absorption of the toxicant. Barbiturates to control convulsions are indicated and are most effective if given before the appearance of convulsions.—*J. Am. M. A., July 19, 1952.*

The Capacity of Bovine Stomachs

Recently the capacities of the stomachs of 30 cattle were studied at an abattoir in Great Britain. A few were fasted but several were given all the food they would eat for three days before slaughter. Most textbooks estimate the capacity of bovine stomachs as ranging from 25 to 60 gal. In this group, the highest capacity was 17 gal. for the four compartments of the stomach, with an average of a little over 10 gal. The capacity of the abomasum was about 6 or 7 per cent of the total.—*Vet. Rec., Aug. 23, 1952.*

Experimental pigs showed a constant but moderate reduction in white blood cells days four to eight after treatment with modified live virus cholera vaccines.—*R. K. Jones, D.V.M., Purdue University, Lafayette, Ind.*

Demodex Folliculorum Studies. I. The Use of Phenamidine as Internal Medication for the Treatment of Demodectic Mange in the Dog

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FOR MANY YEARS, innumerable drugs and chemicals have been used to treat and control demodectic mange in dogs. After short reigns of popularity, most of these products are found to be ineffective in the actual control of the condition. A few of the more recent drugs have been found to be fairly effective in treatment, but many cases will resist the treatment and continue to recur.

At the veterinary clinic of the Ohio State University, we receive and treat approximately 100 dogs with diagnosed demodectic mange during the school year. These cases will vary from those with slight lesions to those with extremely severe infected lesions complicated with systemic involvement. During the past five years, there has been a steady increase in the number of cases treated in the clinic. The use of external topical medication has not proved entirely satisfactory because of the long series of treatments necessary and because of the number of relapses that occur after the skin appears entirely healed and free of mites.

There is more and more evidence being presented that the life cycle is not definitely known and probably involves more than the local skin area where most mites are found by skin scrapings. There is probably some internal systemic migration by the parasite, since mites are found in the lymph glands, blood, and commonly in the gastrointestinal tract and feces.[1,2] If there is an internal systemic part to the life cycle, then some type of internal medication might be the answer to the treatment problem.

Recently a new drug, phenamidine, has been used by the British for the treatment of demodectic mange.[3,4,7] The drug originally was used in the treatment of canine babesiasis in South East Africa, but according to the manufacturer[5] "it has also proved of definite value in a high percentage of cases of canine demodectic mange." Recommendations are that a total of six injections of a 5 per cent solution of phenamidine, at a dose rate of 0.3 cc. per kilogram of body weight, be given subcutaneously at four-day intervals. If any anaphylactic reaction occurs, then an antihistamine should be administered one to two hours before the injection.

METHODS

The object of these experiments was to determine whether internal medication of a 5 per cent solution of phenamidine was effective in treatment of demodectic mange; whether the drug was toxic and in what amounts; and whether there were any ill-effects or damage to the tissue from the use of the drug.

A number of dogs were injected with a 5 per cent solution of phenamidine M. & B. Some of the dogs were used to test the toxicity of the drug, while others with demodectic mange were used both in treatment tests and toxicity tests. The drug was injected subcutaneously at a dose rate of 0.3 cc. per kilogram of body weight. A total of six injections, at four-day intervals, was given except to a few dogs which received additional injections. In some cases, in order to test the toxicity of the drug, larger doses were given at the four-day intervals.

During these trials with phenamidine, several attempts were made to infect dogs with *Demodex folliculorum* but with no positive results. Many attempted transfers of the mites are reported in the literature with few cases of actual laboratory infection from one dog to another.[1,2]

EXPERIMENTAL RESULTS

Case 1.—A 6-month-old Boxer puppy was used to determine the infectivity of demodectic mange. The animal was apparently normal except for a congenital blindness. During a three-month period, the dog was continually exposed to dogs that had active cases of demodectic mange with open, infected wounds. The dogs would roll together and bite each other in play. Material from

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The phenamidine solutions used in these experiments were supplied through the courtesy of Dr. S. F. Scheidy of Sharp & Dohme, Philadelphia, Pa.

a badly infected dog was rubbed periodically into the head region. At no time during the three months did noticeable lesions appear in the skin of this animal.

Case 2.—A 3-year-old Collie cross that was apparently normal was placed in cages with dogs that were heavily affected with demodectic mange. This dog was kept in contaminated cages with infected dogs for over two months and some material from infected dogs was rubbed on and into the skin, but no lesions developed. At the end of the two months, the skin was normal.

Case 3.—A male Collie puppy, weighing 12 lb., was given phenamidine (1.8 cc./5% sol.) subcutaneously. This dog was apparently normal and was used only to test the effect of the drug on young animals. Two injections, four days apart, were given; the animal showed no reaction to the drug. Euthanasia was performed and on necropsy no lesions were found due to the use of the drug.

Case 4.—A 3-year-old part Collie cross, weighing 30 lb., was used to test the action of phenamidine. The dog was in apparent good health at the beginning of the experiment. It was given a total of six injections of phenamidine (4.2 cc./5% sol.) subcutaneously at four-day intervals. After the second injection, the dog appeared nervous and held its head turned to the right side, as in encephalitis. About ten minutes following each injection, the head twisting was very pronounced with accompanying muscular tremors and some depression. The animal vomited profusely after each injection and later would not eat. A few days following the last injection, the dog appeared to recover and a month later showed no ill-effects from the drug.

Case 5.—A 4-year-old female Terrier, weighing 15 lb., was used to test the toxicity level of the drug. An initial subcutaneous injection of phenamidine (2.1 cc./5% sol.) was given without ill-effects. A second injection (4.2 cc./5% sol.) was given four days later. After this second injection, the dog became depressed, had muscular tremors, and vomited. Since the dog continued to show these symptoms following the second injection, a third injection was not given. Persistent diarrhea developed the day following the second injection. On the fifth day following the second injection the dog developed, in addition to the constant tremors, diarrhea, and depression, a posterior paralysis which persisted for ten days. Benadryl hydrochloride was given orally and dextrose was given intravenously. A bromsulphalein test showed extensive liver damage.* After ten days, the dog became brighter and appeared almost normal. A month later, another injection of phenamidine (4.2 cc./5% sol.) was given subcutaneously. Within five minutes, there were violent reactions with excessive salivation, retching, discharge from the nose, anxious expression, and continual emesis, with numerous bowel evacuations. Benadryl hydrochloride failed to halt the symptoms. During the next ten days, the dog showed incoördination of the hind legs with continual retching and emesis. Euthanasia was performed and a necropsy revealed extensive hemorrhages and enlarged, congested lymph glands.

Case 6.—A 3-year-old female Cocker Spaniel, weighing 22 lb., with a severe case of sarcoptic mange was used to test the toxicity of phenamidine and also to note the reaction on sarcoptic mange mites. A total of eight injections of the drug (3 cc./5% sol.) was given subcutaneously at four-day intervals. After each injection, there was a marked reaction to the drug even though antihistamines in daily therapeutic doses (pyribenzamine hydrochloride and benadryl hydrochloride) were given orally during the entire period of treatment. After the last two injections, the reactions were severe with edema of the face, extreme depression, hypermia, and almost total collapse. On the fourth day following the last injection, the dog collapsed and died. Necropsy revealed ecchymotic hemorrhages over the heart and severe hemorrhagic gastroenteritis with the mesenteric lymph nodes enlarged and congested.

Case 7.—A male Hound, 5 years old and weighing 38 lb., with extensive denuded areas of demodectic mange over the forelimbs and neck was given six injections of phenamidine (5.5 cc./5% sol.) subcutaneously at intervals of four days. There were no reactions from the six injections. The skin conditions appeared to improve only slightly; many live mites were found after the end of the treatment.

Case 8.—A male Hound, 5 years old and weighing 38 lb., had previously been given six injections of phenamidine with no ill-

*This test was performed by Dr. Frank L. Docton of the Department of Pathology, College of Veterinary Medicine, Ohio State University, Columbus.

effects. The animal was then used to test the toxic affect of the drug in larger amounts. Twice the recommended dosage was given. During the first hour following the injection, the animal showed only slight changes, such as depression, with the nictitating membranes protruding slightly over the eyes. The animal rapidly returned to normal. Since there had been little change, the dosage rate was increased to 15 cc. on the second four-day treatment. The reaction to this injection was severe. Within ten minutes, the animal vomited profusely and the nictitating membranes completely covered the eyes. Severe tremors occurred and lasted about fifteen minutes. Within an hour, the dog had recovered. The third injection of 15 cc. was given four days later. Two minutes after injection, the nictitating membranes began to flicker across the eyes and after fifteen minutes the entire eye was covered by the membrane. The animal became restless, nervous, and vomited frequently. In an hour, the animal was quiet and the nictitating membranes were receding. Fifteen minutes after the fourth injection of 15 cc., the dog was restless, vomited, and the nictitating membranes completely occluded the eyes. Two days later, the dog died. Necropsy showed hemorrhages on the heart and extensive hemorrhagic areas throughout the entire digestive tract with the mesenteric glands also hemorrhagic.

Case 9.—A 1-year-old male Chow cross, weighing 45 lb., was almost completely covered with moist, inflamed, blood-filled, demodectic mange lesions. The mandibular and prescapular lymph glands were swollen. There was a history of previous treatment with a benzyl benzoate product without improvement. The dog was given a total of six injections of phenamidine (6 cc./5% sol.) subcutaneously at four-day intervals. Although the dog was active before treatment, about ten minutes after each injection he would vomit and become depressed. Within an hour after each injection, he would recover. Daily therapeutic doses of benadryl hydrochloride were given for one week before treatment, and these were continued during the treatment period, with large doses given two hours before each injection. This dog showed less reaction than other dogs after the six injections. The lesions were dry and seemed slightly improved, but many live mites were still present.

Case 10.—A male Pointer, 7 years old, weighing 45 lb., and in poor condition, had demodectic mange lesions covering the entire body with many parts denuded of hair. A total of six injections of phenamidine (6 cc./5% sol.) were given at four-day intervals without any improvement in the mange condition. Following the second injection, the animal refused food. Live mites were still found after the treatments.

Six days after the last treatment, 12 cc. of the 5 per cent solution of phenamidine was given to test the toxicity of the drug. Within an hour, the animal was greatly depressed, trembling, had a jugular pulse, and the eyes were partially closed. Five hours later, he was still depressed and had developed diarrhea. Euthanasia was performed the next day and necropsy showed a severe hemorrhagic enteritis.

Case 11.—A 9-month-old female Boxer, weighing 29 lb., had extensive pustular demodectic mange lesions over the head and neck region and scattered lesions over the body and legs. She was given phenamidine (4 cc./5% sol.) subcutaneously. After the first and second injection, emesis occurred; about fifteen minutes following the third injection, the dog became depressed, had emesis, developed diarrhea, and the face became highly hyperemic and edematous. Since there was such a violent reaction, the drug was discontinued. Several days later, examination revealed a large number of live demodectic mites.

Case 12.—A 3-month-old male mongrel pup, weighing 13 lb., with extensive demodectic mange lesions over the legs and abdomen was given phenamidine (2 cc./5% sol.)subcutaneously for a total of six treatments at four-day intervals without any ill-effects. At the end of the six-treatment period, the dog was negative for demodectic mites and the skin was showing improvement. Three months after the end of the treatment, he was still negative for mites and showed no lesions. The dog had a previous history of treatment with a benzyl benzoate product without improvement.

Case 13.—A 1-year-old female Cocker Spaniel cross, weighing 14 lb., with extensive purulent, bloody lesions of demodectic mange over the face, back, and abdomen and lesser lesions over the legs, was given phenamidine (2.1 cc./5% sol.) subcutaneously. On the third, fourth, and fifth injections, there were some facial changes,

slight depression, and muscular tremors. After the sixth treatment, the lesions became dry and started to heal. A month later, the dog had apparently recovered and showed no evidence of demodectic mange mites. This dog had a previous history of several days' treatment with a benzyl benzoate product without improvement.

SUMMARY

The results from the use of phenamidine were not gratifying, even though 2 of the 13 dogs responded to the drug and showed improvement by the absence of lesions and mites. The remainder of the dogs treated showed little or no improvement from the use of the drug. Several of the dogs had severe reactions, with 2 dying from the drug, and in 1, the reactions were so severe that the drug was discontinued. The main objection to the drug was the violent reactions that followed its use when used in the recommended dosage, and the evident injury to the body tissues as found on postmortem. Among the symptoms were swelling of the facial regions, extreme depression, muscular tremors, emesis, bloody diarrhea, incoördination, partial paralysis, and changes in the gastrointestinal tract. One dog used to test the toxicity level showed severe liver disorder. Severe reactions usually appeared within five to ten minutes after the drug was given. The toxic level of the drug was not much greater than the recommended dosage. By the evidence of numerous necropsy changes, the damage to tissue was evidently extensive. The use of antihistamines failed to prevent or alleviate the allergic reactions.

While phenamidine at present does not appear to be the answer to internal medication for the control of demodectic mites, further testing should be done and other types of drugs should be tried.

References

[1]Unsworth, K.: Studies on the Clinical and Parasitological Aspects of Canine Demodectic Mange. J. Comp. Path., *56*, (1946): 114-127.

[2]Oldham, J. N.: Clinical Forum Meeting: Demodectic Mange. Vet. Rec., 59, (1947): 83.

[3]Kirk, H.: Demodectic Mange. Vet. Rec., *61*, (1949): 394.

[4]Lauder, I. M.: Demodectic Mange. Rec., *61*, (1949): 434.

[5]Anonymous: Phenamidine—M&B in Veterinary Practice. May and Baker Ltd., England, 1950.

[6]McCay, C. M., and Udall, R. H.: Phenothiazine in the Treatment of Demodectic Mange. Cornell Vet., *39*, (1949): 73-76.

[7]Greer, F. G., and Banks, P. N.: Toxicity Following the Daily Use of Phenamidine (M&B) in the Dog. Vet. Rec., *62*, (1950): 60.

Pyloric Spasm in the Dog

A 6-month-old male Fox Terrier of excitable temperament had for three months shown an increasing tendency to vomit and an increased appetite. Vomiting had become more forceful until it was expelled a yard or so, a true projectile vomit. X-rays, taken after barium sulfate had been administered *per os*, revealed that none was passing the pyloric sphincter. When sedation with "eumydrin" preceded the barium, it progressed unhampered into the duodenum. This drug was then prescribed for a few weeks. Vomition did not recur and the dog made a complete recovery. — *J. South Afric. Vet. M. A., March, 1952.*

Pigs with vesicular exanthema have a high temperature until the vesicals break.—*E. A. Schilf, D.V.M., Canton, Ill.*

Acorns are not poisonous. Cattle fattened well when fed acorns which had been run through a hammer mill. They may affect the taste of a cow's milk.—*A. A. Case, D.V.M., University of Missouri, Columbia.*

The ring test for brucellosis is cheap and effective. Its chief weakness is that infected herds show no reaction if the affected cows are not lactating at the time of the test.—*M. H. Roepke, Ph.D., University of Minnesota, St. Paul.*

Correction

The following letter was received from H. T. Bonnett of the patent division of the Ciba Pharmaceutical Products, Summit, N. J.:

> Our attention has been drawn to the abstract of a foreign paper which appeared . . . in the February, 1952, JOURNAL of the AVMA [see pp. 104-105], wherein reference is made to "anahist (Ciba)" and later "anahistin." There appears to be confusion, presumably on the part of the original author, as to the antihistamine used. In the interest of accuracy, we wish to point out that "anahist" is not a Ciba product although Ciba does market an antihistamine under the name "antistine."

A Critical Comparison of the Antibacterial Properties of Commonly Employed Sulfonamides

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Indianapolis, Indiana

DESPITE THE addition of various antibiotics to the practitioner's armamentarium, the sulfonamides continue to occupy an important place in the treatment of infectious diseases. In fact, their position has been greatly strengthened since the introduction of mixed sulfonamide therapy.[1-6]

A considerable amount of literature has appeared concerning the *in vitro* activities of sulfonamides, but many of the data are conflicting. This is not surprising in view of the large number of variables encountered in *in vitro* studies. A major part of the disagreement undoubtedly has been due to differences in technique employed by various investigators, all of which has prevented direct comparison of the results obtained.

Considering the number of sulfonamides now being used in both human and veterinary practice, a need was felt for a more critical evaluation of their antibacterial properties, which could be possible only by testing them simultaneously and under carefully controlled conditions. It was thus during an investigation[7] of the absorption and excretion of the more commonly employed sulfonamides that such a study was made in which a variety of pathogens frequently encountered in veterinary practice were used as test organisms.

EXPERIMENTAL

Eighteen different species of bacteria representing 11 genera were selected for the *in vitro* experiments. These are listed in table 1 together with the respective mediums in which they were tested. The sulfonamides employed were sulfanilamide, sulfapyridine, sulfathiazole, sulfadiazine, sulfamerazine, sulfamethazine, sulfabenzamide, sulfacetamide, and sulfisoxazole (3,4-dimethyl-5-sulfanilamido-isoxazole).

Stock solutions of each drug, containing 160 mg. of the drug per 100 cc. of solution were prepared by dissolving the free acid of the respective sulfonamide in distilled water buffered to a pH equivalent to that of the medium in which the particular test was to be run. The solutions were sterilized by Seitz filtration and then tested by a serial dilution method. The initial dilution was prepared by adding aseptically an aliquot of a stock solution to a tube containing an equal amount of sterile *double* strength medium. This was subsequently diluted in twofold steps in sterile *single* strength medium. Each serial tube contained a final volume of 5.0 cc. of medium plus the drug at the various concentrations. The inoculum was 0.1 cc. of an eighteen-hour culture of the test organism diluted so that the initial number of bacteria in each tube averaged about 500 per cubic centimeter. Tubes were incubated at 37 C. and examined for visible growth at 24-hour intervals for three days. Inoculated tubes containing the respective mediums without drug served as controls.

RESULTS

It will be noted from data presented in table 2 that sulfathiazole and sulfadiazine were, in general, the most effective of the nine sulfonamides tested. Both of these

TABLE 1—Organisms and Mediums Used in Evaluation of Sulfonamide Activities

Organism	Medium
Aerobacter aerogenes Escherichia coli	Synthetic medium of Sahyun, et al.[8]
Brucella bronchiseptica Salmonella choleraesuis Salmonella enteritidis Salmonella pullorum Salmonella typhimurium Shigella dysenteriae Shigella gallinarum Vibrio cholerae	Synthetic medium of Sahyun, et al.[8] + 1.0 per cent Casamino acids (Difco)
Staphylococcus aureus	Synthetic medium of Straus, et al.[9]
Corynebacterium pyogenes Streptococcus agalactiae	Proteose peptone No. 3 broth (Difco)
Streptococcus pyogenes	Brain heart infusion broth (Difco)
Pasteurella boviseptica Pasteurella suiseptica	Infusion broth No. 128 (Baltimore Biological Laboratory, Inc.)
Streptococcus equi	Trypticase soy broth (Baltimore Biological Laboratory, Inc.)
Diplococcus pneumoniae (type 1)	Beef infusion glucose broth

From the Research Department, Pitman-Moore Company, Division of Allied Laboratories, Inc., Indianapolis, Ind.

drugs were about equally active against 11 of the organisms studied, while the antibacterial properties of sulfathiazole were definitely greater than those of sulfadiazine against *Diplococcus pneumoniae, Pasteurella boviseptica, Shigella dysenteriae, Staphylococcus aureus, Streptococcus equi,* and *Vibrio cholerae.*

Sulfapyridine was about as effective as sulfathiazole against *Brucella bronchiseptica, Diplococcus pneumoniae, Pasteurella suiseptica,* and *Streptococcus pyogenes,* but somewhat less active against *Aerobacter aerogenes, Escherichia coli, Salmonella pullorum, Streptococcus agalactiae,* and *Streptococcus equi.* Sulfamerazine showed activity comparable to that of sulfathiazole against *Aerobacter aerogenes, Brucella bronchiseptica, Escherichia coli, Pasteurella boviseptica, Pasteurella suiseptica, Salmonella pullorum,* and *Streptococcus pyogenes.* Compared with sulfadiazine, sulfamerazine was essentially as active against 15 of the organisms tested.

Sulfamethazine was found to be significantly less active than sulfathiazole against 13 of the organisms and less effective than sulfadiazine against eight of the species. While sulfamethazine proved about as active as sulfapyridine against the majority of organisms included in the study, sulfapyridine was definitely the more active of the two drugs against *Aerobacter aerogenes, Brucella bronchiseptica, Salmonella pullorum,* and *Shigella gallinarum.* In comparison with sulfamerazine, sulfamethazine was approximately as effective against nine of the organisms, but less potent against the remaining eight species for which endpoints were obtained.

The activity of sulfisoxazole appeared equal to that of sulfathiazole for seven of the 11 species against which both drugs were tested, while sulfathiazole was decidedly more effective against *Pasteurella suiseptica, Streptococcus equi,* and *Streptococcus pyogenes.* Sulfanilamide, sulfabenzamide, and sulfacetamide exhibited the weakest antibacterial properties of the sulfonamides studied. Over-all activity of sulfabenzamide was about equal to that of sulfacetamide but greater than that of sulfanilamide. None of the nine sulfonamides were active against *Corynebacterium pyogenes* at the maximum concentration employed.

DISCUSSION

The data presented should be of particular interest to the clinician as a useful index of the relative antibacterial activities of various commonly employed sulfonamides, an exact comparison of which has been heretofore rather difficult. It is be-

TABLE 2—Comparison of in Vitro Activities of Sulfonamides

Organism	Lowest concentration of drug (mg./100 cc.) preventing visible growth after seventy-two hours' incubation*								
	SA**	SP	ST	SD	SM	SMM	SB	SAC	SX
Aerobacter aerogenes	5.0	0.63	0.16	0.08	0.16	2.5			
Brucella bronchiseptica	20.0	0.63	0.31	0.31	0.31	2.5	10.0	1.25	0.31
Corynebacterium pyogenes	>80.0	>80.0	>80.0	>80.0	>80.0	>80.0	>80.0	>80.0	>80.0
Diplococcus pneumoniae (type 1)	10.0	2.5	1.25	5.0	5.0	2.5			
Escherichia coli	2.5	0.16	0.04	0.02	0.02	0.08	0.16	0.31	0.02
Pasteurella boviseptica	20.0	2.5	0.31	1.25	0.63	1.25	0.63	2.5	0.63
Pasteurella suiseptica	40.0	2.5	2.5	2.5	1.25	5.0	80.0	>80.0	20.0
Salmonella choleraesuis	80.0	10.0	0.63	1.25	2.5	20.0	10.0	5.0	0.63
Salmonella enteritidis	>80.0	20.0	2.5	5.0	10.0	40.0			
Salmonella pullorum	80.0	5.0	1.25	1.25	2.5	20.0			
Salmonella typhimurium	80.0	5.0	0.63	0.63	2.5	5.0	20.0	10.0	1.25
Shigella dysenteriae	5.0	0.63	0.04	0.16	0.16	0.31			
Shigella gallinarum	80.0	20.0	2.5	2.5	10.0	80.0			
Staphylococcus aureus	40.0	10.0	0.63	10.0	5.0	10.0	5.0	5.0	0.63
Streptococcus agalactiae	40.0	20.0	5.0	10.0	20.0	20.0	20.0	>80.0	10.0
Streptococcus equi	20.0	5.0	1.25	5.0	10.0	10.0	10.0	10.0	10.0
Streptococcus Pyogenes	40.0	20.0	10.0	20.0	20.0	20.0	40.0	40.0	>40.0
Vibrio cholerae	10.0	1.25	0.08	0.31	0.31	0.63			

*Less than a fourfold difference in endpoints not considered as significant.

**SA=sulfanilamide; SP=sulfapyridine; ST=sulfathiazole; SD=sulfadiazine; SM=sulfamerazine; SMM=sulfamethazine; SB=sulfabenzamide; SAC=sulfacetamide; SX=sulfisoxazole.

lieved that the findings are reliable because of the uniform methods by which they were obtained and, within limitations of the *in vitro* test, they should be of some practical value in the selection of sulfonamide therapy. It is interesting to note that Maclay and Slavin,[10] using a different technique, observed essentially the same order of activity for the first six drugs of the present series. Sulfabenzamide, sulfacetamide, and sulfisoxazole were not included in their investigation.

A question of fundamental importance which has received considerable attention[11-16] is whether the sulfonamides are specific in their action against microorganisms. Upon superficial examination of data presented here, it might be concluded that the sulfonamides do possess a certain degree of specificity. However, careful consideration of the results will indicate that any differences in *in vitro* activity are merely quantitative rather than specific, and that the effectiveness of a particular sulfonamide varies with its potency. On the other hand, clinical experience has shown that the order of activity of various sulfonamides is not always the same, and that the efficacy of a sulfonamide *in vivo* will depend not only upon its antibacterial activity *per se* but upon other factors not operating in the test tube, *i.e.*, the extent of absorption, degree of plasma protein binding, tissue retention, and rate of excretion. Sulfathiazole and sulfisoxazole, for example, show marked antibacterial properties *in vitro*, but rapid excretion of these two drugs necessitates frequent administration for adequate blood levels. At a concentration of 10 mg./100 cc. of plasma, Gilligan[17] found sulfathiazole to be 75 per cent bound to plasma protein. In comparison, the amounts of plasma protein binding of other sulfonamides was as follows: sulfamilamide, 20 per cent; sulfacetamide, 20 per cent, sulfapyridine, 40 per cent; sulfadiazine, 56 per cent; sulfamerazine, 84 per cent; and sulfamethazine, 84 per cent. That the degree of plasma binding of sulfonamides may effect distribution throughout body fluids and tissues has been suggested by McManus *et al.*,[18] while Davis[19] concluded that a bound drug probably was unavailable for antibacterial action.

SUMMARY

1) The relative *in vitro* activities of nine sulfonamides have been determined against a number of bacteria of pathological significance in animal diseases.

2) In general, the order of effectiveness of the drugs was as follows: sulfathiazole > sulfadiazine = sulfamerazine = sulfisoxazole > sulfapyridine = sulfamethazine > sulfabenzamide = sulfacetamide > sulfanilamide.

References

[1]Hagerman, G.: Sulfonamide Mixtures in the Treatment of Chemoresistant Gonorrhea. Nord. Med., *22*, (1944):1944.

[2]Frisk, A. R., Hagerman, G., Helander, S., and Sjogren, B.: Sulfa-Combination—A New Chemotherapeutic Principle. Brit. Med. J., *1*, (1947):7.

[3]Lehr, D.: Inhibition of Drug Precipitation in the Urinary Tract by the Use of Sulfonamide Mixtures. I. Sulfathiazole-Sulfadiazine Mixture. Proc. Soc. Exptl. Biol. and Med., *58*, (1945):11.

[4]Lehr, D.: The Prevention of Renal Complications by the Therapeutic Employment of Sulfonamide Mixtures. I. Sulfathiazole-Sulfadiazine Combination. J. Urol., *55*, (1946):548.

[5]Lehr, D., Slobody, L. B., and Greenberg, W. B.: The use of a Sulfadiazine-Sulfathiazole Mixture in the Treatment of Children. J. Pediat., *29*, (1946): 275.

[6]Lehr, D.: Low Toxicity of Sulfonamide Mixtures. II. Combinations of Sulfathiazole, Sulfadiazine and Sulfamerazine. Proc. Soc. Exptl. Biol. and Med., *64*. (1947):393.

[7]Florestano, H. J., Blair, H. E., and Bahler, M. E.: Unpublished data.

[8]Sahyun, M., Beard, P., Schultz, E. W., Snow, J., and Cross, E.: Growth Stimulating Factors for Microorganisms. J. Infect. Dis., *58*, (1936): 28.

[9]Straus, E., Dingle, J. H., and Finland, M.: Studies on the Mechanism of Sulfonamide Bacteriostasis, Inhibition and Resistance. Experiments with *Staphylococcus aureus*. J. Immunol., *42*, (1941): 331.

[10]Maclay, M. H., and Slavin, G.: Sulphonamide Investigations. III. The Activity *in Vitro* of Sulphathiazole, Sulphadiazine, Sulphamerazine, Sulphapyridine, Sulphamezathine and Sulphanilamide on Some Common Animal Pathogens. J. Comp. Path. and Therap., *57*, (1947):218.

[11]Fox, C. L., Jr., and Rose, H. M.: Ionization of Sulfonamides. Proc. Soc. Exptl. Biol. and Med., *50*, (1942):142.

[12]Green, H. N., and Parkin, T.: Local Treatment of Infected Wounds with Sulfathiazole. Lancet, *2*, (1942):205.

[13]Marshall, E. K., Jr., Litchfield, J. T., Jr., White, H. J., Bratton, A. C., and Shepherd, R. G.: The Comparative Therapeutic Activity of Sulfonamides Against Bacterial Infections in Mice. J. Pharmacol. and Exptl. Therap., *76*, (1942):226.

[14]Wyss, O., Grubaugh, K. K., and Schmelkes, F. C.: Non-specificity of Sulfonamides. Proc. Soc. Exptl. Biol. and Med., *49*. (1942):618.

[15]Fitzgerald, R. J., and Feinstone, W. H.: Nature

of the Activity of Sulfonamides for the Tubercle Bacillus. Proc. Soc. Exptl. Biol. and Med., *52*, (1943):27.

[31]Bliss, E. A., and Deitz, H. C.: A Comparison of the Bacteriostatic Activities of Some of the Newer Sulfonamide Compounds. Bull. Johns Hopkins Hosp., *75*, (1944):1.

[32]Gilligan, D. R.: Blood Levels of Sulfadiazine, Sulfamerazine and Sulfamethazine in Relation to Their Binding in Plasma. J. Pharmacol. and Exptl. Therap., *79*, (1943):320.

[33]McManus, E. C., Scheidy, S. F., Tillson, E. K., Pitt, A. A., and Kemp, R. L.: Distribution of Sulfamerazine and Sulfamethazine Between Blood and Cerebrospinal Fluid of Calves. J.A.V.M.A., *115*, (1949):253.

[34]Davis, B. D.: The Binding of Sulfonamide Drugs by Plasma Proteins; A Factor in Determining the Distribution of Drugs in the Body. J. Clin. Invest., *22*, (1943):753.

Injury of Gastrointestinal Tract by Porcupine Quills

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A male German Shepherd dog, 9 months old and weighing 74 lb., devoured part of a fullgrown hedgehog which, three days previously, had been run over at night on a country road — the head crushed and the body disemboweled. The carcass had been picked up from the road by a passing motorist and thrown into the bushes near the residence of the dog's owner. Three days later, the dog was attracted by the smell of the carrion and dragged the decomposing carcass into the open, where he and his female litter mate did some sampling and returned home full of quills.

The dog's owner (having had long experience in removing quills from his dogs after encounters with live hedgehogs) noticed a different distribution and appearance of the embedded quills — especially the unusual pattern of lodgment and the limp and flexible appearance of the quills. In both dogs, the quills were not sticking out in bunches about the muzzle, as usually received from an attack on a live animal, but about the paws and inside the mouth of the male dog and in the pads of the paws in the female dog and not in her mouth. All visible quills were removed from both dogs, and one large quill from the base of the tongue of the male dog and two from his lips. The female dog suffered no ill effects and probably swallowed no quills.

The male dog, on the second day, developed a cough when eating and a definite dysphagia. On the third day, he was plainly ill and suffering from some injury or obstruction of the upper digestive tract. The temperature was 104.4 F.; the dog was listless and had attacks of coughing, with salivation. He was at once suspected of having received a punctured and infected wound of the esophagus or stomach wall and was given 100 mg. of terramycin by mouth every six hours.

Early the next (fourth) day, the stool of the previous day was found and examined: one piece of solid fecal matter was found to contain six quills — four large quills and two small ones. The large quills appeared to be broken off at the points. All quills were pointing in the same direction in the fecal mass, were coated with mucus, and appeared to be macerated as though by action of the digestive juices. After two doses of terramycin, the temperature dropped to 102.6 F., and there was only slight dysphagia and no salivation. The appetite returned on the fourth day and the dog acted normally. The terramycin treatment was continued for three days. There were no sequelae.

Dr. Marshak is a general practitioner in Springfield, Vt.

Air sac infection in chickens is also called chronic respiratory disease. Antibiotic treatment in the feed seems to be of no help but hurts only the owner's pocketbook.—*H. E. Moses, D.V.M., Purdue University, Lafayette, Ind.*

Diagnosing Cancer by Cell Nuclei. — Scientists have discovered that cancer cells have about twice the volume of nucleic acid in their nuclei as do normal cells. Absorption spectroscopy, the measurement of the amount of light that goes through an object, led to the discovery. Since this is an instrument measurement, it may prove more accurate than the former smear test which depended upon human skill to recognize the cancer cells. The report states that "it is intriguing to think that perhaps the nucleic acids may be the factor that perpetuates the cancerous character of the cells. — *Sci Newsletter, Sept. 27, 1952.*

Equine Encephalomyelitis in Pheasants from 1947 to 1951

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PREVIOUS PAPERS[1-5] have recorded the outbreaks of equine encephalomyelitis in pheasants for the period 1938 to 1946. No outbreak was diagnosed in 1947, but in 1948, the virus was recovered from a lot of 100 females. In October of the same year, pheasants from Pennsylvania showing symptoms suspicious of encephalomyelitis were presented, but the inoculation of eggs failed to reveal the presence of any virus. No infected flock was found during the 1949 and 1950 seasons. In April, 1951, however, six new foci of infection were identified.

As heretofore, after a definite diagnosis was made, the infected premise was visited for the purpose of getting an idea of the physical plant and its surroundings, and to obtain as much additional information as possible with the view that this information might eventually serve some useful purpose in solving the epizoötiology of the disease.

NEW BRUNSWICK OUTBREAK, 1948

A lot of 100 females from the State Game Farm at Forked River, N. J., was brought to the Middlesex County Workhouse on October 1 and placed in a poultry house pending liberation. At the time of delivery, about 10 of the birds showed lameness and others were depressed. The following day, tremor and twisting of the head and neck were observed and 2 birds died. During the next three days, 1, 5, and 4 birds died, respectively, and 10 others were sick. A flock of chickens is maintained on the farm and the experienced poultryman, on seeing the nervous symptoms in the pheasants, suspected Newcastle disease in spite of the absence of respiratory symptoms.

Two dead and 2 live birds were presented for diagnosis on October 5. The latter showed paralysis of the legs and a lateral twisting of the head and neck. They also showed evidence of having been picked by pen mates. The absence of respiratory symtoms, and of gross changes on autopsy, plus the fact that the birds originated in Forked River at a likely season, suggested equine encephalomyelitis.

Brain tissue was collected aseptically from each of the birds and held in a frozen state for three days. Each sample was suspended separately in about 1.5 cc. of broth and inoculated into the allantoic sac of 4, 10-day embryonating eggs on October 8. The material from the 2 dead birds and 1 live bird killed the embryos within twenty-four hours. That from the remaining live bird killed 2 embryos in twenty-four hours, and 1 in forty-eight hours. The fourth egg was harvested at twenty-four hours but the embryo was still alive. Inoculums, for a second passage of each strain made October 15, were prepared from the livers of 3, 24-hour dead embryos and from the one 48-hour dead embryo, respectively, and each was inoculated into 4, 10-day embryonating eggs. All embryos were thought to be dead at 24 hours, but on harvest, 1 was still alive. All embryos in both passages showed typical signs of encephalomyelitis, and all were sterile except 1 which showed gross contamination and another which gave 2 colonies (bird 4, first passage).

As soon as the diagnosis was established, the remaining birds were destroyed. An outbreak of the disease at the game farm from which the birds were obtained was denied and, because vaccination had been practiced there since 1946, inquiry as to the status of these birds elicited conflicting reports. One was that they had been vaccinated with old vaccine, the other, that they had not been vaccinated.

SHOHOLA FALLS, PA., OUTBREAK, 1951

Four dead and 8 live specimens were presented for examination on August 21, with a history that was highly suggestive of Newcastle disease. Sometime previously, the owner had suspected coccidiosis. On July 18 or 19, a dozen chickens from a flock that had been vaccinated against Newcastle disease had been delivered to the farm and the disease in the pheasants began five or six days later. According to the owner, some of the younger pheasants showed a "bronchial cold," but paralysis was also observed and such birds usually died unless given special care indoors. Some birds showed diarrhea and crooked necks. The owner estimated that about 20 per cent of the flock was affected.

The 4 dead birds showed no gross changes on autopsy and no material was saved from them for inoculation. Four live birds also lacked gross changes, but the brain and spleen of 1, the brain of another, and the spleen of a third were pooled

From the New Jersey Agricultural Experiment Station, New Brunswick.

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and frozen. The intestinal content of the remaining 4 birds was watery, and oöcysts were demonstrated microscopically.

On August 24, the pool of brain and spleen tissue was ground in broth and centrifuged.' One cubic centimeter of the supernatant was removed and mixed with 10,000 units of penicillin and 10 mg. of streptomycin (each in 0.1 cc. amounts) and inoculated into 5, 10-day embryonating eggs in a dose of 0.2 cc. per egg. Three of the embryos died within forty-eight hours, but the remaining 2 were still alive seven days postinoculation. A second passage was made August 28, when 4 eggs were inoculated with a suspension prepared from the livers of 2 embryos. One embryo died in twenty-four hours, and the others within forty-eight hours. The liver of a 48-hour dead embryo was suspended and a third passage initiated September 21 by the inoculation of 4 embryos. In this passage, 3 embryos were dead at twenty-four hours and the fourth at forty-eight hours.

As already mentioned, the history of this case and the fact that it originated in Pennsylvania where encephalomyelitis had never been found suggested Newcastle disease. Failure of the virus to kill all embryos in the first passage and the fact that the only deaths occurred after twenty-four hours seemed to point to this infection. The death time pattern in the second passage was still not unlike that of Newcastle disease, and the 1, 24-hour dead embryo was discarded. It was noted, however, that the embryos candled out at forty-eight hours had the appearance of having died soon after the 24-hour candling. In harvesting embryos dead of Newcastle disease, the liver is usually reserved for a subsequent passage, but in this instance amnioallantoic fluid was saved from 2 eggs. When this was tested on September 13, it failed to agglutinate chicken red cells. Consequently, when 3 of the 4 embryos in the third passage died within twenty-four hours, the case was diagnosed as equine encephalomyelitis. Cultures were made from every egg of the three passages, and all were negative.

A second lot of pheasants from the same farm was submitted on September 18 — 9 young birds (5 to 10 weeks old) and 2 yearlings (cock and hen). The owner reported that nearly all of this year's hatch of 800 birds had died. Specimens sent to another laboratory were found to have cropworms, gapeworms, and enteritis; and others sent to still another laboratory were reported to have cropworms, gapeworms, and blackhead.

None of the young birds showed clinical evidence of encephalomyelitis and on autopsy 1 was infested with *Syngamus trachea,* 2 each with intestinal and crop Capillaria, 1 showed nephritis, 1 a cecal core with intussusception of the cecum, and 1 showed no gross changes. The cock showed no nervous disturbance, and its blood serum failed to inhibit red cell agglutination by Newcastle disease virus. The hen was unsteady, walked without direction, and appeared as though in a stupor. Capillaria were found in the crop. Brain tissue inoculated with eggs on September 5 gave negative results. Apparently, the recent losses resulted from parasitic and miscellaneous causes, rather than encephalomyelitis. No further information was obtained.

Hainesville Outbreak, 1951

Three pheasants, about 3 months old, were received by mail September 12 from Hainesville in Sussex County, N. J. Two of the birds showed paralysis of the legs. A pool of brain tissue of the 3 birds was frozen until September 18, when it was suspended in about 1.5 cc. of broth from which 1 cc. of supernatant was removed and to it were added 10,000 units of penicillin (0.1 cc.) and 10 mg. of streptomycin (0.1 cc.). Each of 4, 10-day embryonating eggs received 0.2 cc. allantoically. One egg was accidentally broken after inoculation, but the remaining 3 embryos were dead within forty-eight hours. At harvest on September 20, the embryos were typical and cultures were sterile. The livers of 2 embryos were collected in separate tubes and frozen. In the second passage made September 21, the 5 embryos were dead in twenty-four hours, showed typical changes on harvest, and were bacteriologically sterile.

Pheasants had been reared on those premises for twelve years, but no such disease had been experienced before. Two hatches of May 18 and June 2 totalling 154 chicks were transferred from the brooder houses at about three weeks of age, and combined in one room. A third hatch of 203 chicks on June 10 was transferred, at 3 weeks of age, to a room next to that containing the first two hatches. A disease began in the third hatch but the exact date is not known. A total of 42 had died a week or two before July 28. The losses continued until only 30 survived, and these were transferred in late August (5 to a pen) so that they had no close contact with other birds.

In spite of the fact that the first two hatches occupied the adjoining house and a run separated from that of the third hatch only by wire, they never contracted the disease during some weeks of close contact. Prior to the transfer of the third hatch, the birds of the first and second hatches were placed in a rearing pen. Forty-five breeders occupying a nearby pen never contracted the disease.

In the meantime, 3 more hatches were taken off at intervals of about twelve days to produce an additional 450 chicks. At 7 weeks of age, each of these hatches was transferred directly from the brooder house to the rearing pen already occupied by the first and second hatches. Some of these birds also died, but not until after the transfer to the rearing pen. Thus, the disease existed on the premises at least from July 25 to September 12, or forty-nine days.

According to the caretaker, mosquitoes were not common. Earthworms were plentiful, and the owner thought that these were responsible for his losses. Some of the birds had gapeworms.

EGG HARBOR OUTBREAK, 1951

Three dead pheasants, 8 months old, were brought to the South Jersey branch diagnostic laboratory from Egg Harbor in Atlantic County on September 27. They reported that the disease was confined to the oldest birds (8 months), and that 150 of 500 had died in two weeks. Affected birds were reported to close their eyes and lose the use of their legs. At this time, there were about 800 younger birds and 50 breeders on the place which were not affected.

Autopsy of the 3 birds revealed no gross changes, and cultures taken from the liver were negative. The pool of brain tissue was held in a frozen state until it was later brought to New Brunswick for inoculation.

A tentative diagnosis of encephalomyelitis was made. On September 29 and 30, the owner vaccinated about 1,000 birds, administering the vaccine first to the youngest (3 months) and then to the older birds. For this purpose, commercial vaccine (eastern type) was obtained, and 0.2 cc. was given to each bird. About 300 birds, the breeders, and some 8-month-old birds were not vaccinated.

The owner brought 4 more birds to New Brunswick on October 5. Three of these showed no gross changes on autopsy, and the thin fourth bird revealed only an accumulation of urates in the kidney. A pool of brain tissue of the 4 birds was suspended in broth, treated with antibiotics, and inoculated that day into 3, 10-day embryonating eggs in a dose of 0.2 cc. Two embryos died within twenty-four hours, and the third within forty-eight hours. The changes in the embryos were typical, and all cultures were negative. A suspension of the liver of the late dead embryo was injected into 4, 10-day embryonating eggs on October 12 in a dose of 0.2 cc., and all embryos were dead within twenty-four hours. These were typical in appearance and were shown to be bacteriologically sterile.

The brain pool taken before vaccination was eventually brought to New Brunswick and inoculated into 6, 10-day embryonating eggs on October 30. All embryos died within twenty-four hours, were typical in appearance, and free of cultivable organisms.

Pheasants had been reared there for five years. The original population was started from hatching eggs, and no new stock had been introduced. The breeders in 1951 consisted of 43 females and 8 males. The females averaged 104 eggs per bird, but hatchability was only 40 per cent in contrast to 80 per cent the previous year. There had been no excessive picking. The runs were on low ground and often wet. Sparrows were numerous, but no sick ones had been seen. There were ticks in the woods during the spring, but not many mosquitoes an any time. There was a pond within 200 ft. of the pens. The geese, ducks, and chickens on the place were never affected by the disease which attacked the pheasants.

The disease began about September 15 in one of two large runs which together contained about 500, 8-month-old birds, and then spread to the adjoining run. A newly constructed run on the other side of the first run affected contained about 100, 7-month-old birds which were never attacked. The birds in this run, however, had been vaccinated. Behind the second run affected, and separated only by wire, were two smaller runs. One contained the breeders, which was the fourth lot to become affected, and all but 1 or 2 died. They had not been vaccinated. The other smaller run to the side of that containing the breeders

TABLE I—Yearly Distribution of Outbreaks of Equine Encephalomyelitis with Reference to Place and Time

Case presented	Town	County	Approximate duration of outbreak
Sept. 16, 1938	New Monmouth	Monmouth	Aug. 20 — beyond Sept. 16
Sept. 13, 1939	Forked River	Ocean	Sept. 1 — beyond Sept. 25
Sept. 18, 1939	Freehold	Monmouth	Sept. 6 — Nov. 7
Nov. 10, 1939	Sparta	Sussex	Oct. 20 — beyond Nov. 14
Oct. 15, 1940	Mays Landing	Atlantic	Oct. 1 — beyond Nov. 11
1941	None diagnosed		
1942	None diagnosed		
Sept. 29, 1943	New Gretna	Burlington	Sept. 15 — Oct. 15
Oct. 16, 1944	New Gretna	Burlington	Sept. — Oct. 31
Aug. 21, 1944	Deans	Middlesex	August — beyond Sept. 8
Sept. 26, 1945	Salem	Salem	Latter Aug. — Oct. 2
Oct. 2, 1945	New Gretna	Burlington	Sept. (?) — Oct. (?)
Oct. 6, 1945	Forked River	Ocean	Sept. 30 — Nov. 24
Sept. 12, 1946	New Gretna	Burlington	Aug. 6 — beyond Sept. 12
Oct. 7, 1946	Forked River	Ocean	Oct. 3 — early Nov.
1947	None diagnosed		
Oct. 5, 1948	New Brunswick	Middlesex	Oct. 2 — Destroyed Oct. 10
1949-1950	None diagnosed		
Aug. 21, 1951	Shohola Falls	Pike (Pa.)	July 23 — Sept.
Sept. 12, 1951	Hainesville	Sussex	July 25 — Sept.
Sept. 27, 1951	Egg Harbor	Atlantic	Sept. 15 — Oct. 15
Oct. 22, 1951	Absecon	Atlantic	Oct. 1 — Nov.
Oct. 30, 1951	Dividing Creek	Cumberland	Oct. 25 — Nov.
Nov. 23, 1951	Chester	Morris	Oct. 2 — Dec. 5

contained 30 to 40 nonvaccinated 8-month-old birds which were never affected. In line with, and adjacent to, the two small runs was a long house. The end room (20 by 24 ft.) housed the 8-month-old birds in the first run affected. A feed room separated the end room from the other three rooms of the house (each 16 by 20 ft.). The room next to the feed room contained 100, 7-month-old vaccinated birds which were affected but not severely. The feed room and part of this room joined the newly constructed outside run containing the 100, 7-month-old birds previously mentioned, and which were never attacked. The next two rooms each contained 100, 6-month-old vaccinated birds, and neither was affected.

In line with the preceding house was another house of two rooms, each containing 100, 4-month-old vaccinated birds which remained free of the disease. But between these two houses there was an open run containing 100, 5-month-old birds (the third unit to become affected) which suffered severely. Presumably, this pen had been vaccinated before the disease struck. Finally, there were two brooder houses, each containing 50, 3-month-old vaccinated birds which were never attacked.

The daily mortality from the beginning to the end of the outbreak was as follows:

Date	Loss	Date	Loss
Sept. 15-20	22	Oct. 4	60
21	5	5	30
22	12	6	32
23	8	7	8
24	3	8	14
25	10	9	12
26	27	10	14
27	18	11	14
28	29	12	12
29	20	13	12
30	23	14	8
Oct. 1	28	15	8
2	41	16	0
3	38		
		Total	508

After the outbreak, the owner destroyed an additional 200 birds because they were extremely emaciated and/or showed neurological symptoms.

ABSECON OUTBREAK, 1951

Four live birds, 17 weeks old, were presented on October 22 from a flock of about 265 near Absecon in Atlantic County. One bird, held under observation, recovered. The only autopsy finding was Capillaria in the crops of 2 of the 3 birds examined. Cultures from the liver were sterile. Brain tissue from each of the 3 birds was pooled, frozen, and finally brought to New Brunswick. On October 30, 6, 10-day embryonating eggs were inoculated with a dose of 0.2 cc. of brain suspension. Two embryos were dead within twenty-four hours, and the remaining 4 within forty-eight hours. The changes in the embryos were typical, and all cultures were negative.

In 1949, the owner had obtained 200, 12-week-old pheasants from the State Conservation Department and lost only 2 before they were released. In 1950, he obtained 200 day-old chicks which he raised to 14 weeks of age, during which time 32 died. The remaining 168 were liberated.

On June 4, 1951, 300 day-old chicks were obtained, and during the first week more than 100 died of chilling in consequence of a power failure. Other losses reduced the population to 125 birds by September 1, at which time the cocks were released. About September 15, the owner received 200 females said to be the same age as his own birds. These presumably came from the State Game Farm at Forked River, an already incriminated source of infection, and were supposed to have been vaccinated against encephalomyelitis. About 2 weeks after these were placed with the owner's 61 females, a disease broke out. When the losses ceased, the owner counted 161 birds. When the case was presented on October 22, it was reported that the loss for the three preceding days had been 13, 21, and 3 birds, respectively. As originally reported, the disease killed only the 61 nonvaccinated females, but, since the mortality was actually 100, some vaccinated birds must have died. Forty cocks were delivered March 17 to be liberated with the supposed lot of 161 females.

The surrounding woods were infested with ticks in the spring, but mosquitoes were scarce on account of regular spraying. There had been some picking as evidenced by swollen heads prior to the outbreak. Gapeworms were not known to infect the flock. Red birds, starlings, black birds, and sparrows frequented the premises, but none showing paralysis was seen.

DIVIDING CREEK OUTBREAK, 1951

Three 14-week-old pheasants (2 alive) were presented from this Cumberland County farm on October 30. The duration of illness was reported to be two to four days. No respiratory symptoms had been seen, but 2 birds developed wry necks. The flock had not been vaccinated. There were no autopsy changes, and liver cultures were negative. Brain tissue was collected from each specimen, pooled, and frozen. Later, the sample was suspended, and inoculated into 6, 10-day embryonating eggs on November 20 in a dose of 0.2 cc. One embryo died within twenty-four hours, and the remaining 5 within forty-eight hours. Embryonic changes were typical, and all cultures remained sterile.

Pheasants were first reared here 3 years before. In 1950, 2 males were introduced from another game farm. One of these eventually developed paralysis and was killed, but no mention was made of excessive losses that year. There were 10 hens and 2 cock breeders in the 1951 season, and the hens began to lay the first week in April. Excepting a few eggs incubated artificially, hatching was done by bantams. About 75 chicks were hatched during May to July. At 6 to 7 weeks of

age, the chicks were taken from their foster mothers and placed in a small pen (No. 1). Nearby, there were two larger pens (No. 2 and 3) side by side. The ends of these pens were separated from pen 4 only by wire. The last pen was beside pen 4 and contained the breeders.

When the second brood was taken from its mother for transfer to pen 1, the first brood in that pen was transferred to pen 2, and so on, so that at the end of the hatching season, the oldest birds were in pen 4 and the youngest in pen 1. For some reason, an old cock bird had been kept in pen 3.

When specimens were presented October 30, the owner reported a loss of 30 in the last five days. The disease spread from the youngest lot to the oldest. It never affected any of the breeders, whose pen was separated from the others only by wire, nor the old cock bird in pen 3.

After losses stopped, the owner sold 15 birds and had 6 left. The loss had been 39 birds.

The adjacent woods were infested with ticks in season, and the caretaker of traps claimed that more mosquitoes were to be found here than elsewhere. The pheasants had no gapeworms to the owner's knowledge. There had been no cases of brain fever in horses in this area in the last ten to fifteen years. The owner was attracted by the presence of numerous sparrows, some of which were described as being drunk, and occasionally a dead one was found. The owner thought these may have been seen as late as September.

CHESTER OUTBREAK, 1951

The 4 live specimens from this outbreak in Morris County were brought in on November 23. Clinically, the birds showed paralysis and nervous symptoms. Three birds were autopsied and showed no gross changes. Brain tissue, however, was collected from each specimen and the pool held in a frozen state until suspended and inoculated on November 23. On that day, each of 5, 9-day embryonating eggs received 0.2 cc. of suspension with the result that 2 embryos died within twenty-four hours, 1 within forty-eight hours, and 2 within seventy-two hours. All cultures were sterile. A second passage was made November 30, using as inoculum a suspension of the livers of a 1- and 2-day dead embryo. Of the 4, 10-day embryonating eggs inoculated, all died within twenty-four hours, were typical on harvest, and bacteriologically sterile.

In 1950, the owner used his own females with males purchased in Massachusetts. The breeders for the 1951 season, however, had been reared on the farm the previous year. Hatching began May 5, and continued at a rate of a hatch every five days until about July 1, when about 4,200 were hatched. At about 8 weeks of age, the birds were transferred from brooder to rearing pens, two hatches to each pen, and debeaked at this time. The disease began about October 2 and lasted until about December 5, and affected only pens 1 and 2, each of which contained about 600 June-hatched birds. Of the 1,200 birds, only about 100 survived. There was no spread to pen 3 or to pen 4 in spite of the fact that these pens were separated from pen 2 only by wire. Nor was it spread to pens 5, 6, 7, and 8 which were not adjacent and contained May- and June-hatched birds and breeders.

According to the owner, there was an abundance of earthworms, but he disclaimed any knowledge of gapeworms. There had been more picking in the affected pens than in others.

DISCUSSION

From 1938 to 1951, 20 outbreaks of equine encephalomyelitis were diagnosed in pheasants by virus isolation. The time and geographic distribution of these outbreaks are given in table 1.

The outbreak in Shohola Falls, Pennsylvania, is of special interest because, to the best of our knowledge, the virus has never been recovered from any species in this state.

With respect to New Jersey, the disease in pheasants has now been diagnosed in nine of the 21 counties of which Morris, Middlesex, and Sussex may be considered as out of the enzoötic area of the disease in horses. Both outbreaks in Middlesex County and one of the two in Sussex County were definitely associated with importations of birds from the State Game Farm at Forked River in Ocean County, where the virus was recovered in 1939, 1945, and 1946. The Absecon outbreak of 1951 is also associated with an importation from Forked River. The Hainesville, Egg Harbor, Dividing Creek, and Chester outbreaks appear not to be associated with importations from any source.

A feature of the disease noted in some previous outbreaks and again evident this year was that it did not spread to other birds in close contact (Hainesville, Egg Harbor, and Chester). In some outbreaks, the disease began in the oldest birds (Egg Harbor) and spread to younger ones. In others, the reverse was true (Dividing Creek). Likewise, in some outbreaks, the breeders were severely attacked (Egg Harbor), whereas in others, they escaped entirely (Hainesville, Dividing Creek, and Chester).

Finally, attention is directed to the report that sparrows with nervous symptoms were seen on one of the farms (Dividing Creek) prior to the appearance of the disease in the pheasants. The possibility that wild birds might serve as reservoirs of infec-

tion is suggested by the recovery of the western type of virus from the blood of a nestling magpie and 2 nestling red-winged blackbirds in Weld County, Colorado, as reported by Sooter *et al.*,[6] and the recovery of the eastern type of virus from the blood from an apparently healthy adult purple grackle as reported by Kissling *et al.*[7] The transfer of infection from wild to domesticated birds might be possible through the medium of ectoparasites, of which several species have been found to yield eastern or western type virus. In this connection, however, it is interesting to note that the blood of a 9-day-old nestling English sparrow occupant of a nest was free of demonstrable virus in spite of the recovery of virus from the *Dermanyssus americanus* mites taken from the same nest.[8] And, as regards outbreaks in pheasants, it is difficult to harmonize transmission by ectoparasites with the absence of disease in birds in an adjoining pen which is frequently observed. Failure of the disease to spread from young birds to the breeders, of course, might be accounted for by an immunity resulting from a previous attack.

References

[1]Beaudette, F. R.: Neutralization Tests with the Sera of Pheasants Surviving an Outbreak of Equine Encephalomyelitis. Proc. 3rd Internat. Cong. of Microbiology, Sept. 2-9, 1939, (1940): 93.

[2]Beaudette, F. R.: Equine Encephalomyelitis in Avian Hosts. Proc. 43rd Ann. Meet. U. S. Livestock Sanitary A., Dec. 6-8, 1939, (1940): 185-201.

[3]Beaudette, F. R., Black, J. J., and Hudson, C. B.: Another Case of Equine Encephalomyelitis in New Jersey Pheasants. J.A.V.M.A., *98*, (1941): 449-451.

[4]Beaudette, F. R., and Hudson, C. B.: Additional Outbreaks of Equine Encephalomyelitis in New Jersey Pheasants. J.A.V.M.A., *107*, (1945): 384-386.

[5]Beaudette, F. R., and Black, J. J.: Equine Encephalomyelitis in New Jersey Pheasants in 1945 and 1946. J.A.V.M.A., *112*, (1948): 140-147.

[6]Sooter, C. A., Howitt, B. F., Gorrie, R., and Cockburn, T. A.: Encephalitis in Midwest. IV. Western Equine Encephalomyelitis Virus Recovered from Nestling Wild Birds in Nature. Proc. Soc. Exptl. Biol. and Med., 77, (1951): 393-394.

[7]Kissling, R. E., Rubin, H., Chamberlain, R. W., and Eidson, M. E.: Recovery of the Virus of Eastern Equine Encephalomyelitis from Blood of a Purple Grackle. Proc. Soc. Exptl. Biol. and Med., 77, (1951): 398-399.

[8]Miles, V. I., Howitt, B. V., Gorrie, R., and Cockburn, T. A.: Encephalitis in Midwest. V. Western Equine Encephalomyelitis Virus Recovered from mites *Dermanyssus Americanus* Ewing. Proc. Soc. Exptl. Biol. and Med., 77, (1951): 395-396.

Determining the Age of Cattle by Their Teeth

In this era, when scientists are able to identify not only persons but their relatives as well by their detailed physical characteristics, it is interesting to check whether similar progress is being made with regard to lower animals. The *Farm Journal* of September, 1952, tells about one gadget called a prolifometer, developed at the University of California, for detecting a small bulge near the mid-forehead of cattle, which indicates whether they are carriers of dwarfism. This indeed is progress. However, when we turn to *Hoard's Dairyman* (May, 1952) we find a short illustrated article on how to tell the age of cattle by their teeth, which indicates a marked lack of progress.

The schedule of eruption of horses' teeth is quite accurately known, because a horse is seldom examined without its teeth being checked. However, the teeth of cattle are seldom checked and some accepted schedules for the eruption of cattle's incisor teeth are quite misleading. The schedule referred to, showing the pairs of incisor teeth erupting at 2, 3, 4, and 5 years of age respectively, may have been correct many years ago and might still apply in some breeds of cattle, especially if their development was hampered. This schedule has often been reprinted and is too generally accepted.

Some modern textbooks give a more accurate schedule showing the first pair of incisors erupting soon after 18 months of age instead of at 2 years, and with an interval between eruption of succeeding pairs closer to nine months than to one year. Fairly extensive observations made by the writer years ago on young animals of several breeds indicated that the interval may average even less than nine months. The first pair seemed usually to erupt between 18 and 21 months of age, the second pair at about 27 to 30 months, the third pair at about 36 months, with the fourth pair following shortly after. Thus a cow with a full mouth of incisor teeth was more likely to be just over 3 years of age than to be 5 years of age. This scale seemed to hold true for the well-nourished beef and dairy breeds except for the Brown Swiss cattle whose teeth apparently erupt later.

A thorough re-check on this subject would be interesting. Perhaps then our literature could be brought up to date.—W.A.A.

More Chloramphenicol Poisoning

Fatal aplastic anemia, apparently resulting from chloramphenicol (chloromycetin) medication is reported from the British Isles. Three children from 4 to 7 years old were given the antibiotic for whooping cough. Each was given ¼ Gm. two or three times daily for twenty-four to thirty-four days, so that they received a total of 12, 20, and 24 Gm., respectively. The two who received the larger doses developed jaundice in thirty-nine and forty-nine days, respectively. The 6-year-old who received a total of only 12 Gm. seemed listless, apathetic, and slightly jaundiced on day 60 after the first dose. In about ten to sixteen weeks, each developed bruise-like spots on their limbs and elsewhere, followed soon by various types of hemorrhages. In spite of blood transfusions and other treatments, death occurred in from three to five months. In each of these cases, treatment was prolonged much beyond the five days usually recommended. It is suggested that the dangers of using chloramphenicol is perhaps being overemphasized, yet it is recommended that whenever possible other antibiotics be used instead.—*Brit. M. J., Aug. 23, 1952.*

For the first time in eleven years, foot-and-mouth disease has been reported in the Philippines on Masbate Island. One hundred and thirty-eight cattle were infected, 2 had died; 15 carabaos were infected, 6 had died. Polivalent vaccine, 10,000 doses, have been ordered.—*Am. Cattle Producer, Sept., 1952.*

Hyaluronidase and Kidney Stones

The concentration of uric acid salts and other solids in urine sometimes exceeds the limit of their solubility in pure water. The question therefore is not, why do urinary calculi form but what keeps more of them from forming? It is believed that colloids in the urine coat the microscopic crystals and prevent them from forming aggregates. When urine, which contains colloid, is evaporated it leaves an amorphous dried solid whereas urine with little colloid leaves definite crystals. When one patient whose urine solids did crystallize was injected with hyaluronidase, his urine solids changed to an amorphous pattern. Strong peptizing agents such as hyaluronidase have been demonstrated to have some value in controlling urolithiasis in chronic stone-forming patients.—*What's New, Abbott Laboratories, Aug., 1952.*

Resistance to Trichostrongylus in Lambs

In 1945 and again in 1946, 6 pairs of twin lambs were used in an experiment with *Trichostrongylus axei*. When 1 month old, 1 of each pair was given a carefully determined number of infective larvae. Its mate was left as a control. Two lambs were given 10,000 larvae; 2 were given 15,000, and 2 were given 20,000. Four months later, all the lambs were given 40 daily doses of 4,000 infective larvae. Egg counts and weight gains were recorded weekly, then the lambs were killed and examined when 9 months old.

The smaller doses of larvae seemed to have increased the lambs' resistance against a later infestation; the intermediate dose had little or no effect, but the larger dose apparently had decreased their resistance. This suggests that the intake of a small number of larvae early in life may actually be beneficial while larger doses are detrimental.—*J. Helminth., Jan., 1952.*

Edema disease of pigs was diagnosed at Purdue University in two or three herds in 1950, 13 herds in 1951, and 15 in 1952.—*A. L. Delez, D.V.M., Purdue University, Lafayette, Ind.*

Of 13 vaccination failures in Georgia, when one modified live virus hog cholera vaccine was used on apparently healthy herds of pigs, five were postvaccinal reactions between days 4 to 14, and eight were immunity failures.—*W. L. Sipple, D.V.M., Georgia.*

The saltlick, where a mixture of phenothiazine and salt to control parasites in sheep is kept, should have a roof over it. Otherwise, the drug is likely to be spoiled by continued exposure to light and rain.—*Prairie Farmer, Sept. 6, 1952.*

Glucose and dextrose are names commonly used for the same sugar.—*J. Sampson, D.V.M., University of Illinois.*

NUTRITION

Vitamin E Deficiency in Beef Calves

GERMAIN R. HOULE, D.V.M.

Caribou, Maine

FOR SEVERAL years, there has been a serious loss of calves of the beef breeds in Aroostook County, Maine. Those affected are from a few days to 3 months old and are born in the winter and spring months.

The condition had been diagnosed as acute pneumonia. Some believed the disease was infectious in nature.

The first cases seen by the author were in December, 1950, and January, 1951. They showed diarrhea and pneumonia with indications of dietary deficiency. The condition seemed to be associated with poor feeding practices and faulty barn ventilation.

By February, the signs of deficiency were more pronounced. Iodine deficiency was manifested by the development of goiters. Scours became more prevalent. There was little response to treatment and many calves died.

In March and April, the new cases showed the symptoms and gross lesions described in vitamin E deficiency. Pneumonia and scours developed apparently as a result of this vitamin deficiency.

The experimental administration of *alpha* tocopherol gave convincing evidence that vitamin E deficiency was the basic cause for loss of calves.

Thousands of calves are involved and the heavy losses sustained yearly has constituted a serious economic handicap in the area.

Calves of dairy herds seem not to be affected by this deficiency and thus attention was focused on the dietary differences of the dairy and beef herds.

The cows of beef herds here generally receive a ration composed of hay, oats, barley, and pea silage. The calves are born before the dams go to pasture and usually the pea silage has been completely fed or is badly spoiled. Thus, the ration is extremely low in vitamin E content and, as very little is said to be stored in the body, a deficiency probably soon develops in the dam and the calf. The dam does not develop symptoms. The better calves are affected more severely, presumably because of a greater requirement of the vitamin.

SYMPTOMS

Calves with vitamin E deficiency show varied symptoms depending on the muscles affected, but there is a similarity in the symptom complex of all cases.

The clinical cases may be roughly classified into either a typical or atypical group.

In the atypical group is found the occasional calf with a chronic bloat. All are unthrifty. Many in this group have pneumonia and may have a very putrefactive, watery diarrhea.

In the typical group, the symptoms are variable but follow a pattern. Three divisions are made in this group. The first division includes those showing spontaneous muscular dystrophy. In this division, the illness is peracute and death occurs quickly. By the time the owner notices symptoms, it is usually too late for treatment to be effective. This illness occurs at the age of a few days to 3 months, but approximately 95 per cent are 4 to 6 weeks old.

In the second division are the subacute cases. These develop symptoms more slowly. They have a bright and alert appearance. Some develop respiratory distress and tire easily. Others show muscular weakness and stiffness. They move slowly and are able to stand for only a short time. If made to stand or walk, their legs suddenly give way and they fall to the ground. Some calves show both muscular and respiratory involvement. Grinding of the teeth is another symptom.

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The author acknowledges the aid and encouragement of Dr. Thomas J. Jones, dean, University of Georgia School of Veterinary Medicine, in diagnosing and controlling this condition.

The third division is the chronic type. These generally show an inability to stand but have a bright appearance. Others breathe fast but walk fairly well. These bright-looking calves will usually recover with vitamin E therapy or if fed grains or if the dam receives a ration containing vitamin E. Treatment for pneumonia has been credited with assisting the recovery of some of the calves but usually the ration has been improved simultaneously.

Other symptoms observed are: respiratory distress with a frothy nasal discharge sometimes tinged with blood; râles in the bronchioles and trachea which may be heard at a distance in some instances; temperatures from 101 to 106 F.—often the temperature will rise after exertion such as exercise, eating or handling and will fall after a period of rest (only a small number of the calves develop a fever, however); some calves lie down and suckle the cow, others may have a spasm or fit when fed—this may be due to cardiac weakness and malfunction; some calves can not suckle because of involvement of the muscles of deglutition; general motor paralysis develops in a few chronic cases.

Frequently calves are observed to die suddenly as if from heart failure. This often follows when a calf is allowed the freedom of pasture with sudden exercise. The calf will run a short distance and drop dead, presumably because the cardiac muscle has been weakened by the deficiency.

Abdominal breathing, almost a panting, is seen in many of those affected.

Stiffness is not a constant factor as it is in affected lambs.

LESIONS

Autopsy shows lesions on gross examination which are of diagnostic value. These lesions are most prominent in the heart muscle, especially the wall of the left ventricle, and are generally found in the diaphragmatic muscles of those showing abdominal breathing.

The lungs may be normal, congested, or edematous. They may be heavily infiltrated with blood, especially in calves which have died suddenly. Some lungs show pneumonia lesions. Frequently, there is blood-tinged fluid in the pleural and pericardial cavities.

Bilateral involvement of the skeletal muscles is typical. Various muscles may be affected, but the corresponding muscle on the opposite side of the body is also affected. Lesions may be seen on the tongue. The appearance of the muscles has caused the condition to be called white muscle disease. There are white or greyish white streaks giving it a dry, cooked fish-meat appearance. The outer layer of muscle often does not show lesions but deep incision reveals the characteristic appearance. In cases of long standing, calcification may develop in the affected muscles and the calcareous granules may be felt with the fingers or knife.

HISTOPATHOLOGY

Vawter and Records[1] give an excellent description of the microscopic findings stating, in part, that the initial changes observed in skeletal musculature appeared to be atrophic degeneration affecting individual or related groups of fibers. Shrinkage in diameter and length, interruption of continuity, interstitial edema, and leukocytic infiltration generally occur in the order given, with the ultimate formation of a dense mass of basophilic staining cells composed of muscle nuclei, polymorphnuclear leukocytes, histocytes, and giant cells. In some instances, interstitial leukocytic invasion appears prior to any distinct atrophic change in muscle fibers. The muscle striations remain visible until all of the cytoplasm disappears. The muscle nuclei persist, and evidence of regeneration with extension of fibrils is seen in some locations.

THERAPY

For calves which are ill, the oral administration of pure *alpha* tocopherol is effective if the pathological changes are not too extensive. Only those more mildly affected recover, because in a severe case the muscular damage is too great. The dose of *alpha* tocopherol is 1,000 mg. given orally twice daily.

The most effective manner in which to alleviate this problem lies in the field of prevention.

PREVENTION

Little vitamin E is passed to the fetus *in utero*, but it is readily passed to the calf

[1]Vawter, L. R., and Records, Edward: Muscular Dystrophy in Young Calves. J.A.V.M.A., 110, (1947): 152-157.

through the milk if present in the dam's ration.

As grass is considered a good source of vitamin E, a calf will rarely develop the deficiency after the dam has been on pasture for eight days (*see* addendum).

Home-grown grains of oats and barley fed to the dam do not provide adequate vitamin E, but feeding a 32 per cent protein supplement to the dam and the calf in a creep usually prevents deficiency.

The administration of vitamin A, calcium, and iodine seems to reduce the vitamin E requirements of the body.

The prepartum administration of vitamin E is not effective in preventing the development of the deficiency in the calf. It must be fed postpartum so that the vitamin is in the milk to prevent the onset of muscle degeneration. Wheat germ oil does not seem potent enough (particularly for therapy) as a source of vitamin E. It is difficult to handle and the vitamin content is easily destroyed. The *alpha* tocopherol fraction, which is pure vitamin E, should be used.

Two methods of effective prevention are possible. One is to feed vitamin E in the roughage or in a mixed grain ration. This is costly because of the equipment needed for different roughage processing and the cost of additional grains. Furthermore, many calves will not eat enough ration while suckling, to prevent the deficiency.

A successful method is the oral administration of pure *alpha* tocopherol to each calf once or twice a week at the rate of 1,000 mg. per dose. This procedure is relatively inexpensive to follow and may be carried out by the owner at his convenience.

After diagnosing vitamin E deficiency and checking the feeding practices, it is possible for an experienced observer to predict the severity of the loss to be sustained unless remedial and preventive measures are applied.

When deficiency becomes apparent in some calves, *alpha* tocopherol should be administered in the same dosage daily for two or three days to all calves on deficiency rations.

CONCLUSION

Calves of cows which are . . . on pasture and whose ration is otherwise deficient in vitamin E should be treated under veterinary supervision.

Vitamin A, calcium, and iodine should be added to the ration of the brood cows when indicated, and faulty housing conditions should be corrected.

Addendum.—During July, 1952 (after this article was submitted for publication), many calves born in May developed symptoms of vitamin E deficiency, probably because the local drouth since mid-June had reduced the vitamin content of the grass. These calves show no symptoms except unthriftiness—the chronic type of deficiency. One, destroyed for autopsy, revealed considerable muscular dystrophy. They responded less well to tocopherol therapy than did those treated in the spring, probably because the muscular dystrophy was more advanced.

Relative Digestibility of Fats and Oil

In trials on rats, butterfats were found to be the most digestible, vegetable oils were next, and body fats were the least. There was little difference in the butterfats of cows, buffaloes, goats, and sheep. Coconut oil was the most digestible of the vegetable oils. In general the lower the melting point, the more digestible is a fat. Probably due to their high melting point, body fats are poorly digested.—*Indiana J. Vet. Sci., March, 1951.*

Protein Synthesis in Chickens.—Green plants and microörganisms can build sulfur-containing amino acids by using sulfuric acid and its salt. It was presumed that animals got all their amino acids from eating plants or meat. Scientists have now traced radioactive sulfur right to the proteins in eggs laid by hens which were injected with dilute sulfuric acid.—*World's Poult. Sci. J., April, 1952.*

There were no significant differences in efficiency of feed utilization between lots of pigs on a control ration and those supplemented with terramycin at the rate of 5 mg. per pound of ration containing 15 to 18 per cent protein.—*F. Thorp, Jr., D.V.M., et al., Michigan State College.*

Rumen transplants to be effective must be fresh and must contain the specific, viable organisms. Cuds directly from a healthy animal should be repeated weekly for young calves.—*W. R. Pounden, D.V.M., Ohio Agric. Exper. Sta., Wooster.*

Fish Oil Feed and the Pullorum Test

Having encountered many unaccountable false or partial reactors to the pullorum test in western Australia, the feeding of fish oils as a source of vitamin A was suspected of influencing the test. When experimentally fed, these reactions began to show up about two or three weeks after commencing the oil feed. They disappeared in a similar time after the oil feeding was stopped. Not all oils seemed to have this effect. It is recommended that for about four weeks prior to pullorum testing, no fish oils be fed.—*Austral. Vet. J., August, 1952.*

Streptomycin and Vitamin Development.—The effect of oral streptomycin in man on the urinary secretion of B vitamins was studied. Six men, each on a different diet, were kept in separate metabolism wards. Each served as his own control, since data were collected before and after streptomycin was administered. During the eight to twenty-two days of administration, streptomycin almost completely inhibited the growth of coliform organisms and some other intestinal organisms which probably are the source of B vitamins. The formation of biotin and niacin in particular was greatly reduced. Extensive use of such antibiotics in many may result in nutritional deficiencies.—*Nutr. Rev., Oct., 1952.*

Surface Active Agents as Growth Stimulators in Chicks

The consistency of growth improvement in poultry when fed vitamin B_{12}, antibiotics, and surfactant supplements has been checked with various basic feed rations. A high degree of correlation between growth responses to antibiotics and surfactants was noted. Apparently, chicks react quite similarly to the two products. In 108 experiments on 3,508 chicks, results indicated that surfactants may be as valuable in stimulating growth as antibiotics alone, but they apparently have no synergistic action with vitamin B_{12} as have antibiotics. Therefore, surfactants are not the equal of combined antibiotics and vitamin B_{12}.

Some of them are too expensive for commercial use and the cheaper ones seem to be relatively inconsistent in their benefits. Two theories as to their mode of action are proposed. First, as with antibiotics, they may have a selective inhibition on certain bacteria in the intestine of the chick, second their wetting properties may facilitate a more rapid assimilation of nutritional factors from the intestine. — *World's Poult. Sci. J., April, 1952.*

Chemical Changes in Silage

Plant cells remain active — using oxygen, giving off carbon dioxide, and creating heat — for some time after a plant is cut. When packed into a silo this continues until the oxygen is exhausted, usually four or five hours. Microörganisms are also active, fermenting the sugars and causing a rise in temperature. The temperature rise may continue for fifteen days. Much of the sugar is changed to alcohol, lactic and acetic acids in one or two days. This acidity kills organisms which otherwise would cause spoilage. If the material used has a low sugar content, either molasses should be added so that fermentation will be rapid, or acids may be added. Carelessly made silage may develop an unpleasant odor but this does not seem to be objectionable to livestock.—*J. Agric. South Australia, Aug., 1952.*

Substituting Colostrum for Milk.—Calves fed colostrum until 2 months old had much higher vitamin A and carotene blood levels than did calves which were fed whole milk (*J. Dai. Sci., 34*, 1951). However, their weight gains were about the same. The extra antibodies from the colostrum did not prevent the occurrence of scours but did seem to reduce the number of fatal infections.—*Vet. Bull., July, 1952.*

The male hormone, testosterone, increased beef cattle gains nearly 0.4 pound daily when mixed with barley and alfalfa ration at the Oregon Agricultural Experiment Station. Heifers made a better response than steers. Three grams of testosterone per 100 lb. of rolled barley was the most promising mixture. — *Country Gentleman, Oct., 1952.*

EDITORIAL

Vesicular Exanthema Threatens a Cholera Serum Crisis

Should We Tackle Hog Cholera Eradication Now?

Vesicular exanthema was, on October 16, reported present in 11 states and eradicated in 16 states. However, new foci of infection continue to appear and probably will until all garbage fed to swine is cooked or until the supplies of virus-infected pork, which have entered trade channels, are exhausted.

One of the major casualties of this epizoötic has been the interrupted production of hog cholera serum and virus. The disease has appeared in some serum-producing plants, halting production, and others have sold all their hogs to avoid the heavy financial loss involved. Therefore, a possible nation-wide shortage of hog cholera antiserum in 1953 now appears more than conjectural.

The annual output of hog cholera antiserum, according to the Bureau of Animal Industry's 1951 estimate, was 1,254,000,000 cc. As of September 15, this year, stocks of serum on hand and in process amounted to only 350,000,000 cc., or approximately enough to last until Jan. 1, 1953, under normal field demand. As of September 15, 12 plants which normally produce 39 per cent of the total serum were under quarantine for vesicular exanthema and ten plants which produce 34 per cent had voluntarily closed. The nine remaining plants, which produce 26 per cent, were still operating on limited schedules but with the daily expectancy of possible closure by quarantine.

Further complicating the situation is the fact that about 70 per cent of the swine which have been hyperimmunized for serum production in the past have come from garbage-feeding establishments. A total of 250,000 head are needed each year. They are not now available because most garbage-feeding yards are quarantined or have liquidated their swine. This problem is particularly serious for producers who have been unable to hyperimmunize farm-raised swine without heavy losses as compared to garbage-fed swine. Also under a Bureau of Animal Industry order of 1935, all licensed serum plants must have 40 per cent of their total annual production on hand by May 1 of each calendar year. This poses a most difficult situation under existing conditions.

Some persons believe that an *extraordinary* emergency, instead of just an emergency, should have been declared by the Secretary of Agriculture on Aug. 1, 1952, so that the vesicular exanthema eradication program could have been speeded up. The federal government then would have had to underwrite the total expense instead of just matching the funds spent by the coöperating states, but the eradication campaign would then have been carried immediately into all the states.

It has also been proposed that, if adequate supplies of garbage-fed swine are not available, the serum producers should set up garbage-feeding establishments of their own. However, if uncooked garbage were fed, their plants might soon be closed by the appearance of vesicular exanthema or perhaps other diseases. On the other hand, if cooked garbage were fed to the hogs, would they stand cholera hyperimmunization any better than nongarbage-fed hogs do now?

Garbage-fed swine undoubtedly are frequently exposed to hog cholera virus in pork scraps, which presumably enhances their immunity to cholera. Furthermore, since most garbage-feeding establishments are unsanitary, such hogs are exposed to many other organisms which apparently greatly increases their resistance to other infections. Even hogs from comparatively sanitary garbage-feeding yards are more likely to succumb to ordinary infections, such as salmonellosis, during hyperimmunization, than are hogs from unsanitary yards.

This situation suggests the biggest question of recent years—Would it therefore not be logical to now challenge hog cholera

itself? Hog cholera eradication was accomplished in Canada many years ago, after raw garbage feeding had been curbed, and the disease has not appeared there in the past five years.

Eradication is bound to come sooner or later, so why not start it now?

Here is the situation. Hog cholera can not occur without the specific virus being present. Since the virus does not live long in a decomposed carcass or if exposed to the sun, to drying, or to heat, the three remaining common sources are: (1) sick pigs or undecomposed carcasses; (2) commercial virulent virus; (3) refrigerated pork from hogs in the early or undetected stages of cholera.

If this be true, three steps are necessary: (1) license all garbage feeders and require that all garbage be cooked before it comes in contact with hogs; (2) withdraw from the market all nonmodified, virulent hog cholera virus; (3) quarantine and properly dispose of all cholera-infected herds, and insulate the affected area by immunizing all swine in the surrounding zone.

This is truly a big order but this could also be a big crisis. If we can not have sufficient hog cholera serum, we can not vaccinate the usual number of hogs with the simultaneous serum and virulent virus method. If we can't complete the job why start it with virulent virus, and risk setting up more hog cholera foci?

If it is necessary to eliminate uncooked garbage in order to eradicate vesicular exanthema, then why not get the job done and also eliminate the hog cholera virus in garbage? This would probably be the most difficult part of the problem. In certain recent instances, when new regulations forbade feeding uncooked garbage to swine, the garbage was dumped into a nearby river. This created an intolerable situation. Garbage that is not fed should be burned, buried, or otherwise properly disposed of.

The equipment for either cooking or incinerating garbage in every city will be costly but much less so, surely, than the ravages of cholera, vesicular exanthema, trichinosis, and other diseases that could and should be thus eliminated.

The quarantine, disposal, disinfection, and zone-immunization program for controlling cholera should be a more simple problem than the enforcement of the cooking of all garbage. It would, however, require a coördinated educational program to gain the coöperation of all swine producers and other interested parties. Because of the peculiarities of many swine diseases, the custom of selling marketable hogs when certain diseases are suspected is quite firmly established. Stiff penalties when owners do not coöperate may be necessary to check such practices. Prompt reporting of any cholera-like disease should be mandatory. Effective controls of sale barns and other avenues of traffic in diseased animals, including rendering plants and their trucks, should be instituted; they are long overdue. All swine passing through sale barns or public yards should, whether previously vaccinated or not, be given cholera antiserum.

The necessity for the eradication of hog cholera has been increased, in the past few years, by the serious threat from the development of so-called variants of cholera virus. If such variants were to become widely established we would doubtless regret that eradication had not been accomplished sooner. Those who have anticipated the eventual eradication of hog cholera have been awaiting the development of safe and effective hog cholera vaccines—vaccines incapable of producing the disease yet able to stimulate a satisfactory immunity. Whether we yet have fully satisfactory vaccines may be a moot question but should we wait longer? If all nonmodified virulent virus were strictly confined and all commercially fed garbage was cooked, it is possible that cholera could be eradicated without vaccination, but such a course would be very risky as unsuspected reservoirs of cholera virus may exist. Vaccination with modified or attenuated virus methods, therefore, should be encouraged until the success of an eradication program is well established. If possible, the cooking of all garbage should precede the withdrawal of virulent virus from an area.

It would be necessary to maintain reserve stocks of cholera antiserum to quench the outbreaks which would probably occur for a few years. However, this entire program should require only a fraction of the serum that would be necessary if simultaneous vaccination with virulent virus is continued.

If these two diseases, cholera and vesicular exanthema, can be eliminated in one program, however complicated, the latter disease may prove to have been a blessing

in disguise for the swine industry. However, the present hog cholera vaccination program, the largest single item in the veterinary field, could not be shifted suddenly or terminated without confronting both the biological industry and swine practitioners with mechanical and economic problems.

To test its feasibility and make the adjustments less drastic, it probably would be advisable to put this eradication program into operation by geographical stages. This could be done by states or groups of states, preferably with a natural barrier, such as a river, separating the nonvirus area from that in which virulent virus would still be available. The state of Alabama set the pace, in September, 1951, by outlawing virulent cholera virus. No official reports on their venture are at hand but there has since been very little cholera in the state and their legislature recently extended the act without a dissenting vote.

There is always resistance to change but every action brings a reaction. For instance, if, as many believe, vaccination with cholera antiserum does check and temporarily prevent swine erysipelas, then as less cholera serum is used, more erysipelas would be expected in erysipelas-prevalent territories. Preparations, therefore, should be made for the production of more specific erysipelas biological products.

Be that as it may, the necessary adjustments probably can be made without serious consequences. Many will recall that a somewhat similar, although less critical, problem was presented about fifteen years ago when encephalomyelitis suddenly accelerated the shift from the farm draft horse to the tractor. Some expected the passing of the horse to cripple the veterinary profession, but did it?

Only 3 Brown Swiss cattle have been imported from Switzerland since 1906 when importations were halted because of foot-and-mouth disease.—*Prairie Farmer, Sept. 20, 1952.*

Fees, if too high, drive clients away and cause dissatisfaction; if too low, they lower your prestige and leave insufficient margin for improvements.—*J. P. Carney, D.V.M., Mississippi.*

Professor Joseph Marek 1867-1952

Late in October, word was received of the death of Professor Dr. Joseph Marek, noted teacher and author and honorary member of the AVMA. He died in Budapest, Hungary, on Sept. 7, 1952, at the age of 85 years.

The name of Professor Marek is known to generations of veterinarians and to veterinary students of today as co-author with Professor Franz Hutyra of that unequaled work on animal diseases, "Special Pathology and Therapeutics of the Diseases of Domestic Animals," which had several editions in German and has had five editions in English, the most recent in 1949. These writings, formerly published in two large volumes and more recently in three, comprise the most comprehensive and authoritative reference sources available in veterinary medical literature.

The names "Hutyra and Marek" are bywords in veterinary circles, made so by the earlier translation of their work by Mohler and Eichhorn, in collaboration with Greig of England. Professor Hutyra died several years ago and since then Professor Rudolph Manninger had been a co-author with Professor Marek.

Leptospirosis—A Tough One to Diagnose

This issue of the JOURNAL leads off with a comprehensive article on leptospirosis by Bohl and Ferguson of Ohio State University. We are learning that this disease is widespread and prevalent in various domesticated animals, so it behooves us to make as thorough a study of it as possible.

Progress, concerning leptospirosis, has been and is being made. However, despite its occurrence in other areas, most of us in the Middlewest were unprepared to cope with it, and similar diseases in cattle, when it, or they, first appeared in the summer of 1950.

Unfortunately, the midwestern diagnostic laboratories were little, if at all, better prepared to cope with such diseases than were the practitioners. Our confusion may be illustrated by a few case reports.

CASE REPORTS

On July 20, 1950, a yearling Hereford heifer was found to be losing weight, weak, and pale

with distinctly yellowish eyelids. She was alert, with a normal temperature, but had a fast, pounding heart, and thin watery blood. Her urine was not observed. Symptomatic treatment with ferrocobalt and arsenical compounds did not prevent her death two weeks later.

On August 3, a 5-year-old milk cow that had seemed normal the day before could scarcely walk in from the pasture. She was depressed, temperature 104 F., wine-tinted conjunctiva, hemoglobinurea, Tallqvist blood hemoglobin reading –90, swelling in two mammary glands, and a yellowish green viscid secretion from the other two quarters. Liberal doses of penicillin and sulfonamides did not prevent her death in about eighteen hours.

Autopsy revealed a wine-colored edema of the swollen mammary glands and of the interlobular lung tissues, a relatively normal spleen and liver, and kidneys dark with tiny hemorrhages.

In the next four weeks, 6 other strange cases were seen—4 calves on two farms with marked hemoglobinurea and sudden deaths, and 2 cases, a yearling heifer and a fat steer, which did not show hemoglobinurea but died in a day and revealed hemorrhages on the thymus, heart, and other tissues on autopsy.

Five of the above 8 animals were autopsied. Only 1, a 300-lb. calf, had a slightly enlarged spleen. The same calf also had a few greyish infarcts of the liver. The laboratory reported a *Clostridium hemolyticum*-like organism from this calf and from the cow but Leptospira organisms were found in none and a search by two laboratories failed to find any organisms in 2 of the cases.

The next seven months produced only 3 of these strange cases but April, 1951, brought more confusion. A 2-year-old Holstein-Friesian, fresh one month, sick four days, with fair rumen action, temperature 102.2 F., and heart pounding at 105 per minute, died in spite of a blood transfusion. In her blood, Leptospira organisms were finally identified.

In another herd, 5 cows in three weeks developed varieties of acute mastitis with very severe, unusual, general symptoms. Two were marketed quickly, 2 died in spite of liberal doses of penicillin, streptomycin, and sulfonamides but none were autopsied. Specimens of milk produced staphylococci and Pasteurella but no Leptospira. These were definitely unusual cases but may not have been leptospirosis.

In another herd, 7 of 10 Guernsey cows sickened within two to eight days, after having been shipped in from Nebraska, with very strange symptoms. There was no mastitis or changes in their milk but all had initial high temperatures, were alert but weak, 3 developed pneumonic symptoms, and all but 2 seemed to respond to treatment. One died suddenly, with pneumonic lesions only. The other was near death for a week then developed symptoms of chronic encephalitis. No Leptospira organisms were recovered so these may not have been leptospirosis.

Not until late in the summer of 1951 did we have the advantage of serological tests and then the picture changed completely. While some clinically positive cases were negative to the test, many clinically doubtful cases reacted positively to leptospirosis. At first, such tests suggested that probably all of those earlier suspected cases had been leptospirosis. Later, we began to suspect that either the test was erroneously all-embracing or that some form of occult leptospirosis had created many reactors which were detected only when the animal was tested because of symptoms which might be those of a different disease.

By January, 1952, a total of at least 82 probable cases of leptospirosis had been encountered in 43 different herds. Of these, only 15 had a noticeable hemoglobinurea. Only 3 of the 15 survived. Clostridium organisms were reported from 2 of these and also from 2 without hemoglobinurea. Perhaps some of these cases actually were infectious icterohemoglobinurea and not leptospirosis but, later, several similar cases were found positive for leptospirosis.

On Sept. 6, 1951, a big Shorthorn milk cow was ailing, ate less, gave less milk, acted tired, temperature 101 F., pulse 85, urine wine-colored. She was given four doses of 5 Gm. of streptomycin about every forty-eight hours and slowly recovered. The agglutination test was positive. Her mate became ill on September 10, gave only a little green, viscid milk, dribbled a blackish, thick urine, had a temperature of 103 F., pulse 68. In spite of 5 Gm. of streptomycin daily for three days, she became worse, heart pounding, her blood very watery; she died on Sept. 17. Her first test was negative but a second, a week later, was positive.

In addition to the types already mentioned, there were 7 mild mastitis cases similar to those described by Little and Baker[1] and a few quickly fatal cases in cows but the majority occurred in feeder cattle and were of the chronic type. Some of the latter apparently were present concurrently with shipping fever. In several cases, the leptospirosis seemed to develop after the animal had recovered from shipping fever but in a few the febrile stages of the two diseases apparently struck simultaneously with markedly fatal results. Symptoms frequently seen among the milder cases were: pale yellowish eyelids, a fast, pounding heart, anemia, normal or mildly raised temperature, stiffness due to edematous limbs or perhaps to arthritis, a poor appetite, and occasionally diarrhea. One heifer developed a typical purpura hemorrhagica-like swelling of the lower half of her head, but recovered.

Of the 82 cases at least 37, and perhaps a few more, died, so the mortality would be 45 to 50 per cent. However, there were probably many mild unnoticed cases in these same or other herds which, if they had been included, would reduce that percentage.

It is usually unwise to attempt to determine a diagnosis by the response an animal

makes to a specific treatment, yet when other means are not available such circumstantial evidence may be considered. After using quantities of sulfonamides, streptomycin, and penicillin, as well as some terramycin, vitamin A, and almost every other conceivable drug or combination thereof, on supposedly leptospirosis cases, our feeling was that none were of measurable value. Conversely, the response of shipping fever cases to treatment was usually very gratifying. We felt, therefore, that in the herds where there was doubt, the cases which responded promptly were probably uncomplicated shipping fever and those which showed no response were probably complicated with leptospirosis. When serological tests were later made on such cases they usually reacted. Incidentally, while antibiotic treatment seems to be of considerable value in canine leptospirosis, the disease in man often shows little if any response to such treatment.[2]

Obviously, some of the confusion about diagnosis could have been cleared up by later testing but events prevented this. Moreover, most of those doubtful cases had been removed by death or marketing and what proof could there be that a reaction, if one did later occur, was due to that particular illness?

Much of this confusion will doubtless soon be clarified as the collective experience and research on leptospircsis accumulates.

[1]Little, R. B., and Baker, J. A.: Leptospirosis in Cattle, J.A.V.M.A., 116, (Feb., 1950): 105.

[2]Hall, H. E., Hightower, J. A., Rivera, R. Diaz, Byrne, R. J., Smadel, J. E., and Woodward, T. E.: Evaluation of Antibiotic Therapy in Human Leptospirosis, Ann. Int. Med., 35, (Nov., 1951): 981.

Meeting Agricultural Goals

The agricultural output of 1952 will be close to the largest on record, chiefly because of the large wheat, corn, and poultry production. The July drought, felt mainly in the South, reduced corn, hay, and some truck crop yields but the small grain had been harvested. The production of livestock and livestock products for the year is expected to reach an all time high. The total output of food grain should top all except one or two previous years and exceed 1951 by 30 per cent. The wheat crop was 11 per cent above the 1952 goal. The corn crop will miss its goal by 5 per cent but is about 5 per cent over last year's crop and the ten year average. The oat crop is close to the year's goal but barley and sorghum are considerably below their goals. The hay crop will be about 3 per cent short of its goal and about 6 per cent short of last year's crop.—*Quart. Rep. by Director of Defense Mobilization, Oct., 1952.*

U.S.D.A. Warns Against Illegal Shipment of Animal Disease Organisms

The U. S. Department of Agriculture states that in recent months several instances of illegal movement of animal disease organisms and vectors in interstate commerce have come to their attention. Restrictions are explained in the Department's BAI order 381, part 122, entitled "Rules and Regulations Relating to Viruses, Serums, Toxins, and Analogous Products, and to Certain Organisms and Vectors."

All laboratories, research institutions, and others dealing with animal disease organisms and vectors are requested to comply with this order. Movements are allowed under permit only when such shipments serve the public interest and after ample safeguards are provided to protect against the further dissemination of such agents.

Million Dollar Microbe

Rutgers University began a study in 1915 of actinomycetes, a widely distributed family of soil microbes. From it, they isolated the antibiotic "actinomycin" in 1939. Since then, they have developed nine other antibiotics from the same source, including streptomycin in 1943, and later, streptothrycin, and neomycin. Meanwhile, other laboratories have developed terramycin, aureomycin, and chloromycetin from the same source.

It is unlikely that these antibiotics are produced while the microörganism is living in the soil. Furthermore, streptomycin seems to have little effect on other soil organisms. To produce antibiotics, the organism must be cultured under special nutritional conditions. In 1951, about 160 tons of streptomycin were produced.—*Research at Rutgers University, N. J., Oct., 1952.*

Advise the JOURNAL of any change of address

CURRENT LITERATURE

ABSTRACTS

Pathological Correlation Between Intestines and Kidneys of Dogs

Three cases of canine enteritis are studied both grossly and microscopically. The macroscopic and the histopathological changes in the intestines and kidneys of these dogs have duly been recorded. The morbid changes of the intestines and those of the kidneys are respectively similar in all the 3 cases. From the result of the findings in these, it has been apparent that there is a relation between the pathology of the intestinal tracts and that of the kidneys, as the disease of one frequently incites the varied degree of morbid changes in the other.

Accordingly, as a matter of principle, due care should invariably be taken for the prevention of the secondary affections of the latter before they make their headway as the complications to the diseases of the former. Similarly, the diseases of the former often usher in as a consequence to the primary affection of the latter. Therefore, this pathological correlation should be foreseen in dealing with the diseases either of the intestines or of the kidneys. If this point is overlooked or ignored, the diseases of one mounted with the usual complicated pathology of the other augment fatal termination rather than rapid cure.—[*B. Choudhury, M.S. (U.S.A.), Calcutta: Pathologic Correlation Between Intestines and Kidneys of Dogs. J. Indian Med. Assoc., 21, (March, 1952):* 253-257.]

Neuropathological Diagnosis of Hog Cholera

One hundred and fifty-five porcine brains were subjected to gross pathological, histological, and bacteriological studies. Mouse and rabbit inoculations were made for the exclusion of rabies and Aujeszky's disease. Aside from visceral organs, approximately seven blocks of brain tissue were processed by the paraffin method and stained with hematoxylin-triosin. Of the 155 brains, 35 came from hog cholera cases and all showed characteristic disseminated, nonpurulent encephalitis; 10 from vaccinates by rabbit-adapted virus (rovac) failed to show lesions two weeks postinoculation, while of 8 so vaccinated and challenged pigs, 1 showed 2 small vascular cuffs in the thalamus. Two pigs vaccinated by the simultaneous method and challenged every two weeks also failed to show significant lesions. Four neurological cases (1 purulent meningitis, 1 listeriosis, and 2 lymphocytic choriomeningitis-like conditions) displayed lesions quite different from hog cholera. Of 52 brains from hogs ill of noninfectious diseases, 2 showed small nonspecific lesions; 8 from hogs ill of infectious diseases other than hog cholera were normal. Of 36 nonvaccinates, chiefly from Canada, two showed slight nonspecific paravascular cuffs. The nonpurulent, disseminated encephalitis characterisitc of hog cholera was distinct from other conditions noted. Neuropathological examination, together with history, symptoms, bacteriological, and virological studies proved a valuable diagnostic aid. Statistical analysis on these 155 brains combined with 124 from a previous study *(Am. J. Vet. Res., 11,* 1950: 41) by 2 by 2 contingency tables yielded a P value of <0.0001 for occurrence of encephalitis in hog cholera.—[*Charles F. Humboldt and Erwin L. Jungherr: Further Observations on the Neuropathological Diagnosis of Hog Cholera. Am. J. Vet. Res., 13, (July, 1952):* 309-317.]

Avian Neoplasia

A method is described which affords comparative quantitative evaluations of the Rous virus neutralizing antibodies present in avian serums. The antibodies are measured in neutralizing doses per milliliter of serum and determined by the minimum infective dose of a cell-free Rous virus preparation and the highest dilution of serum demonstrating neutralization. The extent of tumor formation is expressed by a tumor index which is based on the degree of neoplastic development in a group of chicks. This method gives consistent results on the basis of the experimental data obtained by testing more than 1,000 avian serums from birds with different types of tumors and injuries.—[*S. G. Kenzy: Studies in Avian Neoplasia. I. A Quantitative Evaluation of Neutralizing Antibodies for the Rous Sarcoma Virus in Avian Serums. Am. J. Vet. Res., 13, (July, 1952):* 388-394.]

Some Aspects of Congenital Passive Immunity to Newcastle Disease in Chicks. II

The literature on the significance of congenital passive immunity in baby chicks contains contradictions, which might be due to the difference in the route of vaccination or exposure used to test this immunity. Hence, the purpose of this study was to compare the intramuscular and intranasal routes of vaccination in day-old chicks of known maternal hemagglutination-inhibition (HI) titers. The data indicate that chicks with congenital passive immunity are refractory to intramuscular vaccination; however, the same chicks vaccinated with an identical dose by nasal instillation seem to

develop infection and a subsequent satisfactory immunity as indicated by high HI titers and resistance to intranasal challenge exposure.—[*Simon Bornstein, A. Rautenstein-Arazi, and Y. Samberg: Some Aspects of Congenital Passive Immunity to Newcastle Disease in Chicks. II. The Relationship of Maternal Hemagglutination-Inhibition Titers in Baby Chicks to Their Actual Immunity. Am. J. Vet. Res., 13, (July, 1952):* 379-382.]

Chemotherapy of Enterohepatitis of Turkeys. II

The effects of 2-amino-5-nitrothiazol and 2-acetylaminonitrothiazol on egg production, fertility, hatchability, feed consumption, and body weight in laying turkey hens was determined by giving the drugs at various levels in the feed continuously for eighteen weeks. At a concentration of 0.1 per cent, 2-amino-5-nitrothiazol reduced production, fertility, and hatchability. Levels of 0.05 and 0.03 per cent were not toxic. At levels of 0.1, 0.05 and 0.03 per cent, 2-acetylaminonitrothiazol apparently had no toxic effects.—[*L. C. Grumbles, W. A. Boney, R. D. Turk: Chemotherapy of Enterohepatitis of Turkeys. II. The Effects of 2-Amino-5-Nitrothiazol and 2-Acetylaminonitrothiazol on Egg Production, Fertility, and Hatchability in Turkey Hens. Am. J. Vet. Res., 13, (July, 1952):* 386-387.]

Gastroenteritis in Swine

The following phases were studied: (1) the survival of the causative agent under various conditions; (2) the effect of centrifugation on the concentration of the causative agent; (3) the susceptibility of laboratory animals to the causative agent; and (4) the effect of treatment.

The results include data on 96 baby pigs, 19 guinea pigs, 43 mice, 4 hamsters, and 5 rabbits.

The causative agent of transmissible gastroenteritis remained infective for young pigs after three days of drying at 67 to 70 F.

Supernatant fluid from centrifuged ground gastrointestinal tract containing 0.05 per cent formalin was not infective for baby pigs.

Ground gastrointestinal tract produced disease after being stored for three years and six months at −28 C.

By centrifuging filtrates for thirty minutes to one hour at 15,000 to 18,000 revolutions per minute, a relative centrifugal force of 20,000 to 25,000 x gravity, the causative agent was concentrated to some extent in the sediment.

No host, except swine, has been found for the causative agent of transmissible gastroenteritis.

Under the conditions of the study, none of the therapeutic agents used (circulin, streptomycin, aureomycin, sulfadiazine, sulfamethazine, sulfathalidine, and arsenic or chloromycetin) were of any value in the treatment of transmissible gastroenteritis.—[*W. W. Bay and L. M. Hutchings: Some Properties of the Causative Agent of Transmissible Gastroenteritis in Swine. Am. J. Vet. Res., 13, (July, 1952):* 318-321.]

FOREIGN NEWS

Comparative Tests with Ring Test Antigens

Comparison of various antigens for the ring test for brucellosis revealed that a hematoxylin antigen and several preparations made with tetrazolium were equally specific and stable but that the tetrazolium antigen was more sensitive. The tetrazolium antigen is easier to prepare and is less expensive than the hematoxylin antigen. An incubation period of one hour is recommended to find "latent infections" which are not disclosed by blood serum-agglutination tests.—[*V. Rislakki and Harry Stenberg: Comparative Tests with A.B.R. Antigens. Nord. Vet.-med., 4, (July, 1952):* 674-689.]—A.G.K.

Bacteriological Examination of Imported Meat-and-Bone Meal

Salmonella species were isolated from 3 and *Erysipelothrix rhusiopathiae* from 10 of 329 specimens of meat and bone, or blood, meal imported into Denmark. In one specimen, there were several different species of Salmonella. A number of the Salmonella had not been previously seen in Denmark. It is concluded that the importation of improperly sterilized meat products may be a means of introducing new types of Salmonella into the country.—[*J. Miller: Bacteriologic Examination of Imported Meat-and-Bone Meal and the Like. Nord. Vet.-med., 4, (March, 1952):* 290-295.]—A.G.K.

Bovine Mastitis Caused by Pneumococci

Two cases of mastitis caused by pneumococci type 15 and type 19, respectively, are described. These occurred in separate herds and were the only cases. Only one quarter was involved in each animal. The disease in each was acute. Treatment with penicillin resulted in prompt relief of symptoms and disappearance of the pneumococci.—[*Erling Eieland: Bovine Mastitis Caused by Pneumococci. Nord. Vet.-med., 4, (July, 1952):* 703-706.]—A.G.K.

Actinomycosis of the Udder in Cattle

Chronic staphylococcic mastitis having the appearance of actinomycosis appears to be increasing in Sweden. A study was made of 144 udders which grossly appeared to have lesions of actinomycosis. Bacteriological studies on 98 cases disclosed *Micrococcus pyogenes* in 84, *Pseudonomas aeruginosa* in 12, and a mixed flora in 12. The other 48 cases presented histopathological changes identical with those from which *Mi. pyogenes* had been isolated, namely chronic granulation tissue

with colonies of gram-positive cocci surrounded by radiating club formations. The two *Ps. aeruginosa* infections also presented the picture of chronic granulomatous change but the colonies of bacteria in the tissues were gram-negative and the clublike structure was more delicate than in the case of the cocci. Injection of Pseudomonas organisms into the udder caused an acute mastitis. During February and March of 1949, 82 cases were collected from a packing plant, which was 1.9 per cent of the cattle killed during that period. The "actinomycotic" changes were more common in the posterior quarters.—[*Aili Tanner: On So-Called Actinomycosis of the Udder in Cattle. Nord. Vet.-med., 4, (July, 1952): 655-673.*]—A.G.K.

Klebsiellosis in Mink and Silver Fox

On five mink ranches, there were cases of an acute disease characterized by local phlegmonous processes in the shoulder or thigh which progressed to generalized lesions of pyemia and death in about a week. Klebsiella strains of Kaufmann's type 2 and 5 were identified as the cause. On a fox ranch, 2 cases of bronchopneumonia were found to be due to Klebsiella, one of Kaufmann's type 5 and the other of an unknown type.—[*H. C. Momberg-Jorgensen: Klebsiellosis in Mink and Silver Fox. Nord. Vet.-med., 4, (July, 1952): 690-702.*]—A.G.K.

Effect of Sulfonamides and Chloramine on Egg Production

It has been observed that the administration of sulfonamides and chloramine for treatment and control of infections impaired egg production, especially in regard to quality of the shell. Experiments reported in this paper demonstrated that the presence of 0.75 to 1.0 per cent or 1 to 2 per cent sulfanilamide chloramine in the drinking water resulted in thin-shelled eggs. This was caused by failure of carbonate formation as the result of carbonic anhydrase inhibition by these drugs in the glands of the oviduct. However, amide-substituted sulfonamides do not have an inhibitory effect on the anhydrase and are therefore safe to use.—[*Sv. Dalgaard-Mikkelsen, J. V. Langmack, and H. E. Marthedal: Effect of Sulfonamides and Chloramine on Egg Production in Hens. Nord. Vet.-med., 4, (May, 1952): 481-493.*]—A.G.K.

Fox Encephalitis

The antigen is prepared by mixing liver from foxes that succumbed to the disease with 10 parts of sterile, 0.85 per cent NaCl solution in a Waring blendor. Phenol, 0.5 per cent, is added. After standing in the refrigerator for three or four days, it is separated by centrifugation. The supernatant is used as the antigen. It may be cleared by filtration through paper. Serums of 88 foxes from farms with no disease gave negative results or at most only 80 per cent hemolysis. From farms where the disease had been diagnosed, a majority of the animals had complement-fixing antibodies. The occurrence of specific antibodies in apparently normal animals indicates that healthy carriers may be a factor in spreading the disease. In cases presented for diagnosis in which no inclusions could be found, the liver was used as an antigen to test against known negative and positive serums. This aided in establishing the diagnosis. There was evidence that virus from dogs may be antigenically the same as that from foxes.—[*Rolf R. Svenkerud: Fox Encephalitis. III. The Complement-Fixation Test Applied for Detection of Antibodies in Blood Serum. Nord. Vet.-med., 4, (March, 1952): 273-282.*]—A.G.K.

Lactoflavine and Periodic Ophthalmia

The lactoflavine concentrations in the blood of normal horses and those suffering from periodic ophthalmia did not show any significant difference.—[*F. Almasy, H. Heusser, and von Ins: Lactoflavine and Periodic Ophthalmia. Schweiz. Arch. f. Tierheilk., 94, (1952): 329.*]—F.K.

Symptoms of Trace Element Deficiencies

The main symptoms, somewhat different according to the element lacking (Mn, Co, Cu, In, F), are: pica and allotriophagy, anomalies of growth, of the development of bones and teeth, of the reproduction and blood regeneration, of the nervous and muscular functions, emaciation, decrease in milk production, eventually death.—[*W. Frei: Symptoms of Trace Element Deficiencies. Schweiz. f. Tierheilk., 94, (1952): 431.*]—F.K.

Etiology of Periodic Ophthalmia

The author tried the transmission and production of periodic ophthalmia in horses by means of eye puncture liquid from an acute case, by intraocular injection of Leptospira cultures and by extraocular injection of *Leptospira pomona*.

In 2 foals, acute irydocyclitis with typical signs of periodic ophthalmia could be induced by extraocular injection of Leptospira cultures. The incubation period lasted three and seven months, respectively. The experiments did not show any relation of periodic ophthalmia with a deficiency of vitamin B_{12}.—[*H. Heusser: Etiology of the Periodic Ophthalmia. Schweiz. Arch. f. Tierheilk., 94, (1952): 296.*]—F.K.

Bacteriological Examination of Milk and Udder Secretions

The author briefly describes the methods of the routine diagnosis of mastitis as applied in the State Serum Institute at Rotterdam. With the

application of the methods, it was proved to be possible not only to detect the most varying infections of the udder but also of a rather high percentage of mixed infections. The consequence of these investigations for the practitioner and the advantage of sampling whole herds and treating all infected quarters with penicillin are discussed.—[*D. Bosgra: The Importance of the Bacteriologic Examination of Milk and Udder Secretions in the Practice of Veterinary Medicine. Tijdschr. voor Diergeneesk., 77, (June, 1952): 409-417.*]—L.V.E.

Myositis Eosinophilica in Shepherd Dogs

In connection with a preceding publication about myositis eosinophilica in Alsatian wolf dogs by one of the authors, another Alsatian dog suffering from the same disorder is described. This type of myositis has been described, up until now, only on the head muscles. This article deals with a patient with a symmetrical myositis eosinophilica on both sides and exclusively located in the caput longum of the musculus triceps brachi and musculus biceps femoris.—[*A. J. Darman and A. M. Ernst en Sikar: Myositis Eosinophilica in Shepherd Dogs. Hemera Zoa, 59, (March, April, 1952): 152-157.*]—L.V.E.

Traumatic Gastritis and Pericarditis in Cattle

The increase in the number of cases of traumatic gastritis in cows and the interest in surgical treatment justifies its consideration on the part of anatomists as well as pathologists. The perforations, as a rule, develop slowly. The passage through the wall of the stomach, as well as of the diaphragm, are preceded by a slight necrosis accompanied and facilitated by the formation of a local, fibrinous pre-perforated peritonitis by which the foreign body is not forced through the abdominal wall but by the layer of fibrin toward the diaphragm. Rapid perforations are apt to cause a more extensive peritonitis. The conditions necessary for the formation of fibrinous or fluid exudates are discussed, and the hazard of operating or not operating are summed up. The author is of the opinion that the principal risk of not operating is the increased chance of serious metastatic processes such as metastatic foci in the liver, the lungs, and the kidneys; thrombosis of the vena cava; and endocarditis. Remembering the marked tendency to spontaneous healing, the author advises not to operate.—[*J. H. ten Thije: Traumatic Gastritis and Pericarditis in Cattle. Tijdschr. voor Diergeneesk., 77, (1952): 321-329.*]—L.V.E.

Newer Swine Erysipelas Vaccines

In experiments carried on at the State Serum Institute (the Netherlands), the immunizing value of Staub, adsorbate, kondo, and Lorenz vaccines was compared. Evidently the Lorenz and Staub vaccines produced the strongest immunity. About nine days after the vaccination with Staub vaccine, a reaction occurred which usually disappeared spontaneously after a few days. Troubles caused by the vaccination failed to appear with the Lorenz, adsorbate, and kondo vaccines. In practice, the Staub and adsorbate vaccines were injected during 1951 in 22,388 and 21,780 pigs, respectively. The inoculation with Staub vaccine showed reaction in 0.7 per cent of the cases and lack of immunity in only 0.06 per cent. The inoculation with adsorbate vaccine caused reaction in 0.09 per cent of the cases and lack of immunity in 0.3 per cent. Experiments in mice proved that Staub vaccine in a tenfold dilution still yielded a complete reaction against an infection with a 250-fold minimum lethal dose of a culture of *Erysipelothrix rhusiopathiae*.—[*S. Bakker: Continued Investigation Concerning the Newer Anti-Swine Erysipelas Vaccines. Tijdschr. voor Diergeneesk., 77, (1952): 342-346.*]—L.V.E.

BOOKS AND REPORTS

The Pharmaceutical Curriculum

This publication is a report of the Committee on Curriculum of the American Association of Colleges of Pharmacy. It consists largely of data drawn from the studies of the pharmaceutical survey, accompanied by interpretations and conclusions of the members of the Committee on Curriculum.

This book should be studied by the dean and all members of the curriculum committee of each school of veterinary medicine in North America. It should be read by other members of the veterinary profession interested in the caliber and philosophy of professional training offered by our veterinary schools. The current situation and problems confronting the profession of pharmacy show a remarkable parallelism to those facing the veterinary profession.

The thesis of "The Pharmaceutical Curriculum" (and of the pharmaceutical survey of 1946-48) seems to be that the major problem in improving the profession of pharmacy is to improve the undergraduate curriculum and training in the colleges of pharmacy.—[*The Pharmaceutical Curriculum. By Lloyd E. Blauch and George L. Webster. 257 pages. George Banta Publishing Company, Menasha, Wis. 1952. Price not given.*]—L. MEYER JONES

Physician's Handbook

This handbook offers a readily available source of factual data, laboratory procedures, and clinical aids commonly used in all branches of medicine. While this book was prepared specifically for the human physician, there is in it a great deal of

information that is either directly or indirectly applicable to veterinary medecine. For instance, the chapter on drugs and hormones is particularly concise and up to date, giving in outline form for ready reference, dosages, principal actions and uses of all products in current use.

The veterinarian will find the chapters on Simplified Laboratory Procedures, Bacteriological Examination and Serodiagnosis, Tests of Endocrine Function, Liver Function Tests, Hematology and Blood Chemistry, Urinalysis and Renal Function Tests, and Puncture Fluids Examination interesting and quite adaptable to veterinary use.

Chapters one to five outline a system of diagnostic procedure for the human patient which is interesting and which contains many points applicable to veterinary diagnosis.

The handy pocket size of the "Physician's Handbook" makes for convenience in having this wealth of useful medical information readily available to the busy clinician.—*[Physician's Handbook: By Marcus A. Krupp (M.D.), Norman J. Sweet (M.D.), Ernest Jawetz (M.D.), and Charles D. Armstrong (M.D.). 7th ed. 380 pages. Illustrated. Lange Medical Publications, Los Altos, Calif. 1952. No price given.]*—E. K. SALES and G. R. MOORE

Fitting and Showing Dairy Cattle

This book should serve as a handy reference for all who fit dairy animals for the show and sale ring, for teachers, county agents, and 4-H club leaders. It is especially valuable as a guide for boys and girls and beginners in fitting animals for exhibition.

The book is well illustrated and written in a manner that is easy to read and understand.

The material is divided into ten sections: (1) Selection of the Show Herd, (2) Steps in Fitting, (3) Feeding, (4) Foot Trimming, (5) Clipping, (6) Horn Training and Polishing, (7) Going to the Fair, (8) The Day Before the Show, (9) Showing in the Ring, (10) Care of Cow and Calf.—*[Fitting and Showing Dairy Cattle. By Jack Spearing. 97 pages. The Iowa State College Press, Press Building, Ames, Iowa. 1952. Price $1.50.]*—E. A. WOELFFER

Clinical ACTH

The book comprises 52 chapters covering the results of the research work completed to date.

The report is on basic and fundamental research which is necessary for any new therapeutic agent, covering such subjects as effects on blood, carbohydrate and protein metabolism, and many others.

Each investigator or group has presented the results of its clinical observations on various infectious and noninfectious disease conditions in man. This is followed by a discussion of each report.

The author is fair and open minded in that he has allowed all of the contributors to the manuscript to present the facts exactly as they had observed them. Veterinarians should look forward to the publications of the use of ACTH in the field of veterinary medicine.—*[Proceedings of the First Clinical ACTH Conference: by John R. Mote, M.D., editor. 607 pages. The Blakiston Co., Philadelphia, Pa. 1950. Price not given.]*—H. C. SMITH

Cortone — A Handbook of Therapy

The contents of this book are divided into three parts: (1) Essentials of Modern Therapy; (2) Treatment with Cortone; and (3) Reactions.

The book contains many illustrations of disease conditions, some of which are in color. A considerable number of references are presented.

The information should be of value to the veterinarian. Since cortone has the ability to suppress active disease manifestations, it is of value in the early stages of disease and should be used in the treatment of some animal conditions.—*[Cortone—A Handbook of Therapy: Published by Merck & Co., Inc., Rahway, N. J. 129 pages. 1952. No price given.]*—H. C. SMITH

REVIEWS OF VETERINARY MEDICAL FILMS

Tick Paralysis in Cattle and Buffalo.—Silent, 16 mm., color, running time approximately fifteen minutes. Produced by the Rocky Mountain Laboratory of the U. S. Public Health Service in Hamilton, Mont.; photography by N. J. Kramis; available from AVMA Motion Picture Library, 600 South Michigan Ave., Chicago 5, Ill., for a handling charge of $2.50.

This is an enlarged, improved version of the film reviewed in the November, 1950, JOURNAL (p. 434), entitled, "An Outbreak of Tick Paralysis in Cattle." This case report in cattle is still the major part of the film but it has been improved by editing. An introduction precedes the report of the outbreak on the ranch which involved 31 yearling cattle. The pictures of the male and female tick *Dermacentor andersoni* add to the introduction.

The other addition to the original film is the first known report of the occurrence of tick paralysis in a herd of buffalo. Six of ten yearlings were affected in less than twenty-four hours. Blood examinations revealed no infection. The only treatment was removal of the ticks, but in twenty-four hours all were again normal with the exception of 1 animal that was lame in the left hind leg.

This film is superior to the original picture. Basically, it is much the same but the additions have materially improved it. It is still useful for much the same purposes, that is, for professional and lay audiences.

THE NEWS

Enrollment in Colleges of Veterinary Medicine, 1952-1953, and Preprofessional Training of First-Year Students

For many years, the December issue of the JOURNAL has published the enrollment of the schools of veterinary medicine in the United States and Canada. Table 2 gives this information for the current year.

TABLE 1—Comparison for the Last Five Years of Freshmen Who Have Two, Three, or Four (or more) Years of Preveterinary Training

	Years of Preveterinary College		
Freshmen	2 yr.	3 yr.	4 yr. or more
1947-1948*	41%	12%	13%
1949-1950	47%	27%	26%
1951-1952	40%	32%	28%
1952	42%	25%	33%

*Of the students admitted during these years, 34 per cent had one year of preprofessional college training.

Table 1 gives the number of years of preprofessional college training of the students who have enrolled each year since 1947. Three hundred and thirty, or 33 per cent, of the freshmen this year have had four years of college training; 231, or 25 per cent, hold degrees of bachelor of science or higher. Whereas the ratio of students accepted to the applicants in 1950 was 1:4 and in 1951 was 1:3, this year it is again 1:3. The 17 schools in the United States, all of which require two years of preveterinary training, accepted 909 freshmen from 2,879 applicants.

Policy Change Relative to Calling Veterinarians for Selective Service

According to information received, the Department of the Army will effect a change in policy in meeting its requirements for veterinary officers beginning January, 1953. Under the new procedure, a call will be placed on Selective Service to procure the number of veterinarians needed by the Army. Those selected for induction from Priority 1 registrants under PL 779, essentiality having been determined, will be given an opportunity to apply for appointment in the Army Veterinary Corps Reserve prior to induction.

This change in policy means that those veterinary registrants in Priority 1 under PL 779, who do not have commissions in the Veterinary Reserve Corps, will be subject to involuntary call for military service to meet the requirements of the Army Medical Service for veterinary officers.

TABLE 2—Student Enrollment for the Academic Year 1952-1953

Approved Schools	Fresh.	Soph.	Jun.	Sen.	Spec.	Grad.*	Total	1951	Change
Alabama Polytechnic Institute	64	66	61	59	0	2	252	247	+ 5
California, University of	52	52	52	52	1	5	214	207	+ 7
Colorado A. & M. College	64	59	54	60	0	2	239	236	+ 3
Georgia, University of	61	60	53	50	0	0	224	209	+15
Illinois, University of	35	28	34	22	0	15	134	124	+10
Iowa State College	70	62	60	57	2	12	263	259	+ 4
Kansas State College	62	60	58	66	0	6	252	262	—10
Michigan State College	64	62	57	51	1	18	253	257	— 4
Minnesota, University of	50	46	51	49	1	21	218	217	+ 1
Missouri, University of	30	31	29	29	0	1	120	122	— 2
New York State Veterinary College	52	48	49	46	0	21	216	213	+ 3
Ohio State University	72	68	70	64	0	19	293	294	— 1
Oklahoma A. & M. College	42	32	34	30	0	0	138	140	— 2
Ontario Veterinary College	64	63	71	74	0	0	272	316	—44
Pennsylvania, University of	56	47	47	41	1	5	197	187	+10
Quebec Veterinary School	22	24	21	24	0	24	115	122	— 7
Texas A. & M. College	64	57	43	47	1	10	222	226	— 4
Tuskegee Institute	22	16	11	3	0	0	52	39	+13
Washington, State College of	49	44	47	41	0	3	184	190	— 6
Totals	995	925	902	865	7	164	3858	3867	— 9

*Hold degree in veterinary medicine, working on advanced degree.

International Veterinary Congress Developments

A bulletin received from the Organizing Committee for the Fifteenth International Veterinary Congress to be held in Stockholm, Sweden, Aug. 9-15, 1953, contained information which will be of interest to veterinarians who are either planning to attend or who may wish to become members of the Congress and obtain copies of the official proceedings.

As announced in previous issues of the JOURNAL (May, 1952, pp. 322-323, and September, 1952, pp. 214-215), plans for participation of United States veterinarians have been under way for some time and tours to various European countries have been arranged in connection with the Congress, as announced in a leaflet mailed to all AVMA members some time ago.

Since that time, nearly 50 persons have indicated their intention of taking one or more of the tours and it appears that there will be a sizable delegation of American veterinarians and their wives at Stockholm.

The Organizing Committee in Stockholm has notified the U. S. Committee that they have accepted 30 proposals of topics and speakers from this country. When definite acceptances of invitations to U. S. speakers are received, the list will be published in the JOURNAL.

OFFICIAL INFORMATION ABOUT THE CONGRESS

Patron of the Congress.—His Majesty, the King of Sweden.

Program.—In addition to the scientific proceedings which will be presented in plenary sessions and section meetings (May JOURNAL), a reception to Congress members is planned for the first day, social arrangements of other kinds, including a special ladies' program, will take place during the week, also the official Congress banquet.

Congress Membership.—Members will include *honorary* (appointed at previous congresses); *ordinary* (official delegates appointed by the governments of various countries and veterinarians and others having a professional interest in the Congress); *extraordinary* (veterinary students and members of families of the foregoing categories); and *special* members (veterinarians, institutions, and others who do not attend or take part in the Congress but who wish to get the proceedings).

Fees.—Ordinary members will pay a fee of about 80 Swedish kroner ($15.50), extraordinary members about 40 Swedish kroner ($7.75). The fee for special members has not been fixed but will be announced later.

Applications for Membership.—These will be transmitted by the appropriate national committees in the various countries. In due time, the U. S. Committee will solicit applications from veterinarians and institutions in this country.

Hotel Accommodations.—Although the Organizing Committee has not announced an official hotel headquarters, it is understood that the Malmen Hotel in Stockholm will probably be so designated or at least be included as an official headquarters. It is a first-class hotel.

Prices for living accommodations are about as follows:

First-Class Hotels.—About $2.50 to $4.00 per day for single rooms; $4.00 to $7.00 for double rooms (twin beds).

Average Hotels.—About $1.50 to $2.50 per day for single rooms; about $3.00 to $5.00 for double rooms (twin beds).

These rates do not include the customary tipping and other charges which amount to about 20 to 30 per cent.

OFFICIAL TOUR BROCHURE AVAILABLE

Travel Service Bureau, Inc., 318 Harvard St., Brookline 46, Mass., which is handling AVMA tour arrangements to Stockholm, now has the complete official tour brochure available for those who are interested in one of the tours announced in the September JOURNAL and briefly described in the leaflet mailed to members. Anyone interested may obtain a copy by writing to Travel Service Bureau. The agency will also be glad to assist those who want to attend the Stockholm Congress but who do not plan to take any of the tours.

Medimetric Institute Survey of Veterinarians

Late in October, several members inquired about a four-page questionnaire they had received from the Medimetric Institute, 23 West 45th St., New York City, asking if the AVMA had approved or was coöperating in the survey. The Association knew nothing about it until the inquiries and copies of the questionnaire were sent in.

A cover letter accompanying the questionnaire stated that a study of a statistically accurate sample of veterinarians was being conducted in the United States similar to one conducted among physicians at the American Medical Association convention in Chicago last summer, which was designed to determine the status of medical practice in this country.

Inquiry at the A.M.A. offices in Chicago revealed that the agency in question made the survey of physicians on behalf of certain major companies in the drug industry and that it was conducted ethically. Although the AVMA was not not apprised of the veterinary survey, it sees no reason why veterinarians who are so inclined should not coöperate by filling out the questionnaires.

—Norwegian National Travel Office

The Fish Market of the old Hanseatic city of Bergen.

STUDENT CHAPTER ACTIVITIES

Iowa Chapter.—Activities of the Iowa State College Student Chapter of the AVMA got underway with the regular fall banquet on October 8, at which time the freshmen were recognized and awards given. On Oct. 18, at the annual veterinary alumni homecoming, 438 attended the entertainment and picnic dinner. Other activities planned for the school year are a Christmas party with a Santa Claus for the children of veterinary medical students, and a skit by the junior class; a ball in the winter quarter, with a Miss and a Mrs. Veterinary Medicine; winter and spring smokers for students and faculty; Veishea dog show and float; and the annual spring dance at the country club.

s/BOB MCCULLY, *Secretary.*

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Missouri Chapter.—On September 17, the University of Missouri Student Chapter of the AVMA held the annual smoker which honors the first year class. One of the speakers was **Captain Kocturk**, a Turkish army officer and veterinarian who gave an interesting talk of border relations with the Russians.

On Oct. 6-7, the School of Veterinary Medicine acted as hosts for the twenty-eighth annual short course for graduate veterinarians. This was the first nonstudent group to meet in Missouri's new student union building.

The chapter has taken over the concessions for the University's home football games in order to raise money for chapter activities.

New officers for the fall semester are Vern Owens, president; R. C. Manfull, vice-president; John P. Hickcox, secretary; and C. W. Monsees, treasurer.

s/JOHN P. HICKCOX, *Secretary.*

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Pennsylvania Chapter.—The first meeting of the school year of the University of Pennsylvania Student Chapter of the AVMA was an informal one dedicated to welcoming the freshmen and providing a place for the mingling of new and old faces and names. Many faculty members, their wives, and large numbers of students from each class were present.

Chapter President **Paul Husted** addressed the group and then introduced the speaker of the evening, **Dr. William Kennedy** of the University of Pennsylvania School of Medicine.

Approximately 150 were in attendance at this meeting.

s/DAVID INGRAHAM, *Secretary.*

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Washington State Chapter.—At a meeting of the Washington State College Student Chapter of the AVMA on Oct. 7, 1952, **Lynn George**, president of the chapter, gave a report of his attendance at the national convention of the AVMA in Atlantic City in June.

Dean E. C. Stone welcomed the freshmen into the chapter and the veterinary college and discussed plans for the coming year. The motion pictures "Battling Brucellosis" and "Brucellosis in Swine" were shown to complete the evening's program.

Officers for the chapter for the fall semester are: Lynn George, president; Bill Harris, vice-president; Barbara Sayre, secretary; Dick Reed, treasurer; Bob Lott, athletic chairman; Jack Robinette, parliamentarian; and Robert King, publicity chairman.

s/ROBERT KING, *Publicity Chairman.*

WOMEN'S AUXILIARY

Value of Membership in the AVMA Auxiliary—An Open Letter to Women Who Are Interested in Veterinary Science.—Membership in our AVMA Auxiliary and in our local auxiliaries are tangible tokens of our interest in the veterinary profession.

In last month's "spotlight" article on our AVMA Auxiliary, the question was asked, "Are YOU a member of the AVMA Auxiliary?" This question was asked in a general sense, so that we who read that article and the other articles on the Auxiliary, as women who are connected in some way with the veterinary profession and who are interested in its progress, might ask ourselves that question.

When that same question is asked of the individual, various answers are received. In many cases, the answer is in the affirmative. In many other cases, it is the reverse. One of the most common reasons for not being a member is that many of us are unable to attend meetings. I would like to enlarge on that.

It is wonderful to be able to attend all the meetings possible. We make new friendships and renew old ones. We come away feeling that the veterinary profession is *the* most wonderful profession, and we have a deep sense of pride that we are a part of it. We appreciate that it is one of the few professions where the wife, mother, or sister can play a part in her husband's, son's, or brother's success, and where she can fulfill that deep urge that all women have to be of help, and in a tangible, practical way.

We must remember, however, that those of us who can not attend meetings have the opportunity to help by our membership in the AVMA Auxiliary, with the knowledge that the dollar we pay out annually for membership is truly a "working dollar," and that it goes to maintain our projects, that is, our loan fund, our annual award to a senior student in each of the accredited colleges; to maintain our contacts (administrative) with affiliated auxiliaries; and our work with the student wives in

the auxiliaries to the student chapters in each of the accredited colleges. (Next month we will tell you more about this important project in detail.)

None of your membership dollar is used for annual meeting entertainment. We know that support of an AVMA Auxiliary brings increased interest in the state, regional, and provincial auxiliaries, and rightly so.

Some of these membership dollars are being used this year for our new project. *The AVMA Auxiliary News.* It is planned especially to keep in touch with our members who are interested but who find it difficult to attend meetings. It will disseminate information about our affiliated auxiliaries, and will be a medium through which we can share common problems and interests. There will be one issue this year, which we hope to have ready for distribution in the early spring. It will be a tangible token of membership, and we hope that it will contribute much toward the future of the AVMA Auxiliary. The executive board of the AVMA Auxiliary feels that it will be an instrument for better understanding, knowledge, and appreciation of what all the affiliated auxiliaries are doing and achieving.

The value of membership in the AVMA Auxiliary is what we gain in knowing that each of us who is a member is, by that same token, showing her interest in a concrete way, and is contributing toward all the constructive projects which the AVMA Auxiliary sponsors.

May I leave this thought with you? Our net membership, as of Oct. 13, 1952, was 2,709. It should be a great deal more, and it CAN be. And remember that . . .

1) Any woman may become an active member of the AVMA Auxiliary if her husband is, or was while living, a member in good standing of the AVMA.

2) Any interested woman who is connected with veterinary science may become an associate member, even though her husband is not a member. (The associate member is not eligible to vote or hold office in the Auxiliary.)

My sincere good wishes to you all.

s/(MRS. H. S.) HAZEL MACDONALD, *President.*

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Pennsylvania Auxiliary.—The annual meeting of the Women's Auxiliary to the Pennsylvania State Veterinary Medical Association was held on October 8-10 at Pocono Manor Hotel in the Pocono Mountains. Ninety members attended. Projects for the year include donations of: $100 to the University of Pennsylvania School of Veterinary Medicine toward furnishing a recreation room for the women technicians and veterinarians; $25 to the AVMA Research Fund; $25 Award to a senior student in the large animal clinic; $10 to the AVMA student loan fund.

Mrs. S. F. Scheidy, Drexel Hill, gave a report of the meeting of the national Auxiliary in Atlantic City in June.

The new officers installed were: Mrs. R. D. Hoffman, Bedford, president; Mrs. Vincent Ruth, Lansdale, president-elect; Mrs. G. L. Hartenstein, York, secretary; and Mrs. James Eaglemen, Wommelsdorf, treasurer.

s/MRS. G. L. HARTENSTEIN, *Secretary.*

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West Virginia Auxiliary.—The fall meeting of the Women's Auxiliary to the West Virgina Veterinary Medical Association was held in Charleston, Oct. 13, 1952. The business meeting and luncheon were held in the directors' room of the Kanawha Airport. Officers elected for the coming year are: Mrs. Elvin R. Coon, Charleston, president; Mrs. Nick Endrizzi, Parkersburg, vice-president; Mrs. Wilbur Rehkemper, Keyser, secretary-teasurer.

The new officers of the West Virginia Women's Auxiliary are (left to right)—Mrs. Wilbur Rehkemper, secretary; Mrs. Nick Endrizzi, vice-president; and Mrs. Elvin R. Coon, president.

The auxiliary voted to make gifts to the AVMA Research Fund and the AVMA Student Loan Fund.

Six charter members were present: Mrs. Rose, Mrs. H. C. Williams, Mrs. S. O. Fisher, Mrs. T. C. Green, Mrs. Howard Newton, and Mrs. S. E. Hershey, who is also a charter member of the AVMA Auxiliary and one of its past treasurers. Mrs. H. V. Miller, a past president of AVMA Auxiliary, was also present.

On the social calendar were a luncheon, a banquet, coffee at Woodrum's, and a tour of the Capitol Building.

s/(MRS. W. L.) MAXINE E. REHKEMPER, *Secretary.*

U. S. GOVERNMENT

Laboratory Training Courses.—Laboratory refresher training courses, sponsored by the Communicable Disease Center of the U. S.

Public Health Service, will be held from Jan. 1, 1953, to Dec. 31, 1953, in Chamblee, Ga., and Montgomery, Ala. For information as to specific dates and locations of the various courses, write to: Laboratory Training Services, Communicable Disease Center, U. S. Public Health Service, P. O. Box 185, Chamblee, Ga.

s/RUTH C. BESSMAN, *Secretary.*

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Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U. S. Bureau of Animal Industry are reported as of Oct. 24, 1952.

NEW APPOINTMENTS

Robert F. Batchelor, Baton Rouge, La.
Alex M. Cole, St. Louis, Mo.
Jack W. Delany, South St. Joseph, Mo.
David J. Doran, Beltsville, Md.
Eugene E. Hamann, Kansas City, Kan.
Ralph C. Howe, Des Moines, Iowa.
Karl Katz, Albany, N. Y.
Sinus Loman, Los Angeles, Calif.
Robert L. Mercer, Sacramento, Calif.
Royal F. Nordstrum, Chicago, Ill.
Daniel Paradee, Indianapolis, Ind.
Thomas O. Roby, Washington, D. C.
Warren G. Swift, Little Rock, Ark.
Elwood Wedmore, Omaha, Neb.
Leroy L. White, Little Rock, Ark.
William W. Whitmore, Buffalo, N. Y.

CANCELLATION

Edward L. Blevins, Ottumwa, Iowa.

DEATH

Ernest V. Stromlund, Sioux City, Iowa.

MILITARY FURLOUGHS

Fleetwood Hines, Jackson, Miss.
Keith E. Peterson, Seattle, Wash.

RETURN FROM MILITARY FURLOUGH

Jacob J. Schacter, Columbus, Ohio.

RESIGNATIONS

Ernest D. Barrows, Cheyenne, Wyo.
Charles L. Dents, Mexico City, Mex.
Mark Field, Mexico City, Mex.
Herbert R. Gomez, San Juan, P. R.
Duron R. Kerby, Mexico City, Mex.
Robert Y. Lewis, Detroit, Mich.
Lyle K. Miller, Fort Worth, Texas.
Alphonso C. Newman, Albany, N. Y.
John E. Quatroche, Jacksonville, Fla.
John Redmond, Dade City, Fla.
James A. Rudolph, Cincinnati, Ohio.
Charles L. Vickers, St. Louis, Mo.
Donald L. Williams, Mexico City, Mex.

TERMINATION

Arthur B. Crawford, Washington, D. C.
Robert F. Batchelor, Mexico City, Mex.

RETIREMENTS

Leo E. Davis, Columbus, Ohio.
George F. Flaherty, Fort Worth, Texas.

TRANSFERS

Raymond E. Caldwell, from Harrisburg to Allentown, Pa.
Clarence O. Finch, from Mexico City, Mex., to Olympia, Wash.
Fred F. Fischer, from Jefferson City, Mo., to Boise, Idaho.
James R. Goler, from Mexico City, Mex., to Cincinnati, Ohio.
James C. Green, from Madison, Wis., to Little Rock, Ark.
Wm. B. Guldenschuh, from Kingston, N. Y., to Rochester, N. Y.
Esco Hollingsworth, from Louisville, Ky., to Evansville, Ind.
Donald Miller, from Yuma, Ariz., to Phoenix, Ariz.
Myron D. Moses, from Evansville, Ind., to Indianapolis, Ind.
Theodore R. Myers, from Boise, Idaho, to Bismarck, N. Dak.
Martin A. O'Brecht, from Portland, Ore., to Omaha, Neb.
Wm. M. Pàrham, Jr., from Mexico City, Mex., to Columbus, Ohio.
James P. Whitman, Jr., from Fort Worth, Texas, to Memphis, Tenn.
George Whitmore, from Indianapolis, Ind., to Beltsville, Md.

TRANSFER CANCELLED

Lawrence D. Boston, from Oklahoma City, Okla., to Denver, Colo.

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Examination for Veterinarians for BAI Vacancies.—The U. S. Civil Service Commission has announced an examination for veterinarian (trainee) for work with the Bureau of Animal Industry, U. S. Department of Agriculture, at locations throughout the country, with a beginning salary of $3,410 a year.

A written test will be given. A four-year course in veterinary medicine is required. Students who expect to complete their courses by June 30, 1953, may apply. The maximum age limit, waived for veterans, is 35 years.

Full information regarding the examination may be secured at most first- and second-class post offices or direct from the U. S. Civil Service Commission, Washington 25, D. C. Applications must be received by the Executive Secretary, Board of Civil Service Examiners, U. S. Department of Agriculture, Washington 25, D. C., not later than Nov. 25, 1952.

APPLICATIONS

Applicants — Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent association shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative By-Laws.

GAW, JAMES S.
Huntingdon, Quebec.
B.V.Sc., Ontario Veterinary College, 1939.

HULBUSH, WILLIAM R.
356 So. Linden Dr., Beverly Hills, Calif.
D.V.M., Washington State College, 1938.

RONE, DONALD
2633 N. Stephens St., Roseburg, Ore.
D.V.M., Colorado A. & M. College, 1951.

Applicants — Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised in the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

Second Listing

SANTECO, RODOLFO T., JR., 1683 Kalakaua Ave., Honolulu, Hawaii.

VAN ZANDT, JOHN N., 97th Vet. Food Insp. Det., Fort Clayton, Canal Zone.

1952 Graduate Applicants

The following are graduates, who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Second Listing

University of Illinois*

LOOMIS, CLIFFORD E., D.V.M., R.R. 4, Ottawa, Ill.

Ohio State University*

DENHAM, JAMES A., D.V.M., Owensboro, Ky.

University of Pennsylvania

FRENCH, CHARLES R., V.M.D., 832 High St., Williamsport, Pa.

AMONG THE STATES AND PROVINCES

Arizona

State Association.—On Dec. 4-6, 1952, the Arizona Veterinary Medical Association will hold its annual meeting in Chandler at the San Marcos Hotel.

The following speakers will present papers on the scientific program: **Drs. Raymond L. Butler,** El Paso, Texas; **R. V. Jessup,** Glendale, Calif.; **W. F. Irwin,** Tulsa, Okla.; **V. D. Stauffer,** consulting veterinarian to Institute of Inter-American Affairs, Washington, D. C.; **James Farquharson,** Colorado A. & M. College, Fort Collins; **B. P. Cardon** (Ph.D.), University of Arizona experiment station, Tucson; **James A. Dolce** (M.D.), public health director, Phoenix; **R. J. Hight,** Arizona state veterinarian; **Donald Miller,** veterinarian in charge, BAI, Phoenix; **Ernest L. Parker** (Ph.D.), Department of Agriculture, Arizona State College, Tempe; **Wm. J. Pistor** and **Raymond E. Reed,** Department of Animal Pathology, University of Arizona experiment station; and **C. G. Salsbury** (M.D.), director of public health for Arizona.

s/R. W. ADAMI, *Secretary.*

British Columbia

Six Veterinarians Licensed to Practice.—The British Columbia Veterinary Association has announced the licensing of the following successful candidates at the recent provincial examinations:

Dr. Victoria Sperber, Kamloops; Dr. P. A. Frier, Victoria; Dr. J. G. Fowler, Prince George; Dr. D. J. Price; Dr. D. A. Perry, South Burnaby; and Dr. A. S. Clerke, Vernon.

Dr. Sperber is a graduate of the Royal Veterinary College of London; Dr. Frier is a graduate of Washington State College; and Drs. Fowler, Price, Perry, and Clerke are graduates of Ontario Veterinary College.

s/DR. J. G. JERVIS, *Resident Provincial Secretary.*

Colorado

State Association.—Dr. Kenneth V. Bolton of Rocky Ford was elected president of the Colorado Veterinary Medical Association at the annual meeting in Denver, Sept. 18, 1952. Other officers elected at that time included Dr. Arthur V. Herzberger, Colorado Springs, as president-elect, and Dr. Paul Pattridge, Golden, secretary-treasurer. These elections were in accordance with the provisions of the new constitution for the election of a president, a president-elect, and a secretary-treasurer for the year 1952-1953 and providing that thereafter the president-elect would assume the presidency, while the association would elect a president-elect and a secretary-treasurer each year.

Nearly 200 veterinarians and their wives attended the annual banquet and dinner dance in the Cosmopolitan Hotel where **Dr. Floyd Cross** acted as toastmaster. **Lieutenant Governor Gordon Allott** spoke briefly at the evening banquet and **Governor Dan Thornton** made a surprise appearance to deliver an address to the group during the afternoon meeting.

The meeting was highlighted by papers contributed by such outstanding authorities as **Dr. A. H. Craige, Jr.,** of Pitman-Moore Co., and **Drs. W. D. Pounden** and **L. E. Johnson** of Ohio State University. Many members felt that the outstanding feature of the meeting was the round-table luncheon where all members had an opportunity to question the speakers in detail regarding their specialties. A great deal of interest was shown by the quality and number of the questions asked and much information was brought out at this time.

Other speakers who contributed outstanding papers were **Drs. A. A. Goodman, Rue Jensen,** and **L. A. Griner,** of Fort Collins; **J. E. Greene,** Alabama Polytechnic Institute, Auburn; and **L. C. Ferguson,** Columbus, Ohio.

s/R. K. ANDERSON, *Resident Secretary.*

California

Short Course for Inseminators.—An eight-day short course for artificial inseminators was held at the University of California, School of Veterinary Medicine, Davis, on Sept. 3-11, 1952. Five members of the veterinary staff cooperated with three from the animal husbandry staff and two from agricultural extension in conducting a course for about 20 student inseminators. One student was from El Salvador and another from Israel. Similar courses have been given in three other states.

Illinois

Short Course.—The Friday forenoon session of the short course at the College of Veterinary Medicine, University of Illinois, October 24 and 25, was devoted to clinical demonstrations by **Drs. F. E. Connor,** Morris; **C. L. McGinnis,** Peoria; **W. L. Munson,** Wyoming, Ill.; **W. G. Magrane,** Mishawaka, Ind.; **W. C. Logan,** U. S. BAI, Urbana; and the following members from the faculty of the College of Veterinary Medicine: **Drs. H. S. Bryan, N. D. Levine, R. D. Hatch, J. O. Alberts, H. J. Hardenbrook, R. E. Witter,** and **L. E. Boley.**

Panel discussions were featured at the other three sessions which were held in the auditorium of the university's fine new veterinary medical building. The auditorium is a beautiful room with unusually fine acoustics.

The panel on anthrax, leptospirosis, and vesicular exanthema was moderated by **Dr. C. C. Morrill,** on Friday afternoon. Members of the staff also reported briefly on their research projects. **Dr. C. K. Whitehair** discussed nutritional problems, and **Dr. C. W. Magrane** gave an illustrated lecture on diseases of the eye.

The Friday evening panel, moderated by **Dr. L. M. Hutchings,** Purdue University, discussed hog cholera vaccines. The members of the Saturday forenoon panel, with **Dr. B. T. Simms,** chief, Bureau of Animal Industry, as moderator, discussed brucellosis.

The meeting adjourned in time for the Purdue-Illinois game.—W. A. A.

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Veterinary Symposium.—On Oct. 22, 1952, the director and staff of the Gaines Dog Research Center in Kankakee, presented the second annual veterinary symposium on "The Newer Knowledge About Dogs."

Among the subjects discussed were breeding, kennel management, nutrition, infectious diseases, noninfectious diseases, and parasitic diseases. The following speakers presented papers: **Drs. Fred J. Kingma,** School of Veterinary Medicine, Ohio State University, Columbus; **Thomas J. Jones,** dean, School of Veterinary Medicine, University of Georgia, Athens; **W. A. Krehl,** Yale University; **G. C. Poppensiek,** Veterinary Virus Research Institute, New York State Veterinary College, Ithaca; **R. E. Witter,** College of Veterinary Medicine, University of Illinois, Urbana; and **Edward K. Sales,** School of Veterinary Medicine, Michigan State College, East Lansing.

One of the features of the program was a conducted tour of Gaines Research Kennels.

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Mississippi Valley Association.—The forty-eighth annual convention of the Mississippi Valley Veterinary Medical Association was held at the Hotel Pere Marquette, Peoria, on Oct. 28-29, 1952.

The following speakers presented papers at this meeting: **Drs. C. T. Easley,** Turner Ranch, Sulphur, Okla.; **Paul Barto,** University of Illinois, Champaign; **R. J. Kirkpatrick,** Galesburg; **Herb Marsh,** Princeton; **John Carey,** West Liberty, Iowa; **J. D. Ray,** White Hall; **Frank Connor,** Morris; **George Mathers,** University of Minnesota, St. Paul, Minn.; **Fred Stuttle** (M.D.), Peoria; and **C. W. Burch,** University of Wisconsin, Madison.

s/A. C. GATHMANN, *Secretary.*

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Northern Association.—The fall meeting of the Northern Illinois Veterinary Medical Association was held at the Hotel Faust, Rockford, on September 17, with 168 men and 41 women registered.

The following business was transacted at the meeting: the Association donated $100 and the Auxiliary $25 to the AVMA Research Fund. A resolution regarding the cooking of garbage before being fed to swine was approved with recommendation to the State Department of Agriculture that it be made a law.

The following speakers presented papers on the scientific program: **Drs. John A. Pinkos,** director of dog food research, the Quaker Oats Co.; **E. A. Woelffer,** Oconomowoc, Wis.; **R. V. Johnston,** Pitman-Moore Co., Zionsville, Ind.; **Morris Erdheim,** Grayslake; **Roy A. Thompson,** superintendent, Division of Livestock Industry, Springfield; **R. C. Klussendorf,** director of veterinary medical services, Commercial Solvents Corp., Terre Haute, Ind.; **Frank Connor,** Morris; **John T. Foley,** Cary; and **Herbert P. Wessels,** Geneva.

The new officers for 1953 are Drs. D. R. Stephenson, Rockford, president; L. W. Derrer, Mt. Carroll, president-elect; J. W. Boller, Harvard, secretary-treasurer; and Frank Connor, Morris, executive board.

s/L. W. DERRER, *Retiring Secretary.*

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Midwest Small Animal Association.—The Midwest Small Animal Association invited the American Animal Hospital Association to hold its regional meeting in connection with the Midwest group in Burlington, Iowa, on November 12 and 13.

The meeting convened at 2:30 p.m. on November 12, with a panel discussion on hospital problems, featuring problems of management, hospital hours, records, quantity buying, and the obtaining of lay personnel. This was followed by a catfish dinner and another panel discussion in the evening.

On the second day of the meeting, the Midwest Association featured a technical program with **Dr. R. H. Jourdan,** Colorado A. & M. College, Fort Collins, and **Dr. George W. Mather,** University of Minnesota, as the principal speakers.

s/WAYNE RISER, *Executive Secretary.*

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New Staff Members Join Illinois Veterinary College.—Four new staff members have been appointed to the staff of the University of Illinois College of Veterinary Medicine.

Dr. L. E. McDonald (MSC '49), formerly an AVMA research fellow at the University of Wisconsin, has been appointed instructor of veterinary physiology and pharmacology. He is a member of the AVMA and the American Association for the Advancement of Science. During World War II, he served in the Air Force.

Dr. H. J. Morgan (ISC '47), formerly in practice at Ruthven, Iowa, was appointed instructor in veterinary anatomy and histology.

Dr. A. H. Safanie (COR '47), formerly assistant professor of veterinary anatomy at Michigan State College, has been appointed instructor in veterinary anatomy and histology. Dr. Safanie, who received the M.S. degree in anatomy from Michigan State College, is a member of the AVMA and the American Association of Veterinary Anatomists.

Dr. D. A. Willigan (ONT '52) has been appointed instructor in veterinary pathology and hygiene. Dr. Willigan is a member of the AVMA and of the Canadian Veterinary Medical Association, and the Ontario Veterinary Science Association.

s/ROBERT GRAHAM, *Dean.*

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Dr. Gomez Visits AVMA Office.—A recent visitor at the AVMA office was Dr. Angel K. Gomez, dean of the College of Veterinary Science at Manila, P.I. A graduate of Manila in 1914, Dr. Gomez took graduate work at the University of Pennsylvania and Cornell University. He has been on the faculty of the College of Veterinary Medicine, University of the Philippines at Quezon City, since then. A new building to house the veterinary college is soon to be constructed outside of Manila, and Dr. Gomez is visiting various schools to survey their facilities. His school has a faculty of 14 and has about ten graduates each year.

Indiana

Short Course.—The fortieth annual short course for veterinarians at Purdue University, October 1-3, was an excellent meeting with about 275 veterinarians registered.

One evening was profitably devoted to reports on research by several members of the staff of the Department of Veterinary Science, Purdue University. Other speakers were **Dr. L. P. Doyle,** Lafayette; **Mr. W. D. Knox,** editor, *Hoard's Dairyman,* Fort Atkinson, Wis.; **Drs. J. W. Green** and **T. K. Jones,** Indianapolis; **M. H. Roepke,** University of Minnesota, St. Paul; **C. L. Nelson,** Jewell, Iowa; **W. L. Sipple,** Tifton, Ga.; **W. A. Aitken,** editor, AVMA Journals, Chicago; **C. R. Smith,** Ohio State University, Columbus; **Wm. Riley,** Michigan State College, East Lansing; **W. D. Pounden,** Wooster, Ohio; **D. Sikes,** Lafayette; **W. V. Hornbacker,** Auburn, Ind.

The large group at the banquet Thursday evening was royally entertained by Purdue's fine Varsity Glee Club and by **Professor L. M. Sears,** a talented speaker. The conference was terminated by a clinical demonstration at the veterinary science building on Friday.

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Northeastern Association.—The Northeastern Indiana Veterinary Medical Association met in Fort Wayne on Oct. 14, 1952. After a round-table discussion of diseases of large and small animals, the Committee on Civil Defense reported ways veterinarians could serve in wartime emergency. Some of these are: treating ailing animals, inspection of meat and other foods, first aid, which could be administered in many animal hospitals, some of which are equipped with x-ray equipment for emergencies.

s/J. L. KIXMILLER, *Resident Secretary.*

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Wabash Valley Association.—**Dr. R. C. Klussendorf,** director of veterinary medical services for Commercial Solvents Corp., Terre Haute, spoke on diseases of cattle at the Sept. 24, 1952, meeting of the Wabash Valley Veterinary Medical Association. He illustrated his discussion with slides. A lively discussion followed.

The hosts at this meeting were Dr. and Mrs. Bruce Klotz of Peru.

s/J. L. KIXMILLER, *Resident Secretary.*

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Tenth District Association.—On September 18, The Tenth District (Ind.) Veterinary Medical Association met at the Indiana Gun Club, Indianapolis, to hear **Dr. H. E. Downing** discuss antibiotics. **Dr. T. K. Jones,** in charge, BAI in Indiana, discussed vesicular exanthema.

At the October 16 meeting in Eaton, Ohio, **Dr. Harold Amstutz,** ambulatory clinic, School of Veterinary Medicine, Ohio State University, Columbus, spoke on bovine fertility and reproduction. His discussion was illustrated with a motion picture.

Dr. and Mrs. H. T. Deason, Eaton, and Dr. and Mrs. M. E. Clark, Boston, were hosts to the group.

s/J. L. KIXMILLER, *Resident Secretary.*

Iowa

Southwestern Association.—The fall meeting of the Southwestern Iowa Veterinary Medical Association was held Oct. 7, 1952, at the Hotel Chieftain in Council Bluffs with 150 in attendance.

The following speakers comprised the scientific program: **Drs. H. U. Garrett,** state veterinarian, Des Moines; **C. W. Brown,** U. S. BAI, Des Moines; **E. P. Anderson,** state veterinarian, Lincoln, Neb.; **J. D. Ray,** White Hall, Ill.; **N. H. Casselberry,** Cutter Laboratories, Berkeley, Calif.; **Morris Johnson,** Iowa State College, Ames; **George T. Edds,** Fort Dodge Laboratories, Fort Dodge; **V. W. Geselichen,** Corn States Laboratories, Omaha, Neb.; **Jack Cady,** Arlington, Neb.; and **E. J. Osen,** Anita. The motion pictures "Vesicular Exanthema in Swine" and "Atrophic Rhinitis of Swine," from the AVMA film library, were shown.

The officers elected at this meeting are Drs. V. U. Thomson, Clearfield, president; H. A. Jokerst, Earling, vice-president; and G. A. Hawthorne, Clarinda, secretary-treasurer.

s/F. B. YOUNG, *Resident Secretary.*

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Eastern Association.—The thirty-ninth annual meeting of the Eastern Iowa Veterinary Association was held in the Hotel Montrose, Cedar Rapids, on October 9 and 10, with an attendance of approximately 225.

The following speakers participated in the program: **Drs. G. H. Moore,** Michigan State College, East Lansing; **H. C. H. Kernkamp,** University of Minnesota, St. Paul; **J. D. Ray,** White Hall, Ill.; **A. J. Murphy,** Winthrop; **Mr. F. E. Condor,** Vita-Vet Laboratories, Marion, Ind.; **Drs. A. R. Stephenson,** Bennett; **Paul C. Bennett,** Iowa State College, Ames; **A. F. Allison,** Marshalltown; **Guy S. Jones,** Iowa Department of Agriculture, Cedar Rapids; **Frank Thorp,** Michigan State College, East Lansing; **W. L. Boyd,** St. Paul, Minn., president of the AVMA; and **Warren E. Bowstead,** Lowden.

The new officers of the Association are Drs. N. R. Waggoner, Olin, president; H. G. Dow, Fort Madison, vice-president; Wayne Thompson, Earlville, secretary; and A. R. Menary, Cedar Rapids, treasurer.

s/F. B. YOUNG, *Resident Secretary.*

Kansas

Southeast Association.—The Southeast Kansas District Veterinary Medical Association met at the Saddle Club in Chanute on September 25. **Dr. Joe F. Knappenberger** of Ashe Lockhart, Inc., Kansas City, Mo., spoke on the shipping fever problem. **Dr. T. P. Crispell** of Parsons acted as master of ceremonies. **Drs. R. A. Couk** and **B. D. Winters** of Chanute were hosts to the approximately 40 veterinarians who attended.

Drs. Lester Jackson of Hiattville, **Ben Shambaugh** of Burlington, and **Charles W. Jackson** of Iola told how they handle the shipping fever problems in their respective practices.

s/K. M. CURTS, *Resident Secretary.*

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Kansas City Association.—On Oct. 21, 1952, **Dr. Milo Johnson,** of the Division of Quarantine, U. S. BAI, presented a paper on vesicular diseases before the Kansas City Veterinary Medical Association. **Dr. A. H. Quin,** Jensen-Salsbery Laboratories, Kansas City, Mo., led the discussion of this and other problems of general interest. The motion picture "Livestock Pest Control," furnished by the California Spray-Chemical Corp., was shown.

s/K. MAYNARD CURTS, *Secretary.*

Kentucky

Jefferson County Society.—At the October meeting of the Jefferson County Veterinary Society, the following officers were elected for the ensuing year: Drs. Joseph T. Stearns, LaGrange, president; Carl F. Govert, Bardstown, vice-president; and Edwin M. Lang, Louisville, secretary-treasurer.

s/F. M. KEARNS, *Retiring Secretary.*

Louisiana

Death of Paul Quilty.—The veterinary medical profession of Louisiana lost one of its most valuable members when Dr. Paul Quilty died recently at his home in Lake Charles. Dr. Quilty was born in Vienna, Ohio, in 1874 and, after his preliminary education there, he entered the Kansas City Veterinary College, graduating in 1903. Shortly after receiving his degree he and a younger brother moved to Lake Charles where they operated a large animal hospital.

Beside his rating as an excellent small animal surgeon, Dr. Quilty had attained the thirty-third degree in masonry, the highest honorary mark that can be conferred by that fraternity. He was a past master of his mother lodge, Lake Charles Lodge No. 165; past master of Calcasieu Lodge No. 400; and past master of Rudolph Krause Lodge No. 433, and charter member of the latter two. He was also a member of El Karubah Shrine temple.

With all of the above duties on his shoulders, still he found the time to help with the founding and organization of the Southwest Louisiana Veterinary Medical Association, a small but active organization. He was a member of the Louisiana Veterinary Medical Association and had been a member of the AVMA.

It can be truly said that he was an honor to the veterinary profession, and that few men, if

any, possessed a higher standard of moral character than he—meekness, kindness, affableness, honesty, and tolerance standing out in bold relief throughout his entire life. His gentle, soft-spoken voice will be sorely missed by those who knew him well.—J.A.G.

Michigan

Southeastern Association.—Dr. **James Archibald,** of the Ontario Veterinary College, discussed atrophic pancreatitis and Sherman bone plating at the October 8 meeting of the Southeastern Michigan Veterinary Medical Association in Detroit.

s/S. KELLY, *Secretary.*

Minnesota

Short Course.—Foot-and-mouth disease, vesicular stomatitis, and various swine and small animal diseases were among the subjects discussed during the twenty-ninth annual short course for veterinarians on the St. Paul campus of the University of Minnesota on October 23-24.

Other subjects discussed were malignant catarrhal fever, pyometra in the bitch, canine distemper, otitis in small animals, recent parasiticides for small animals, dysentery and atrophic rhinitis of swine, and use of the newer hog cholera vaccines. In addition, **Dr. A. H. Quin,** head of the professional service division, Jensen-Salsbery Laboratories, Kansas City, Mo., was moderator of a panel discussion on swine diseases. Other panel members were **Drs. P. C. Bennett,** Iowa State College, Ames; **F. J. Tobola,** Jackson; and **R. A. Merrill, H. C. H. Kernkamp,** and **R. Fenstermacher,** members of the University of Minnesota veterinary staff.

Other guest speakers were **Drs. F. C. Driver,** federal inspector in charge, BAI, St. Paul; **G. E. Keller,** field veterinarian, Minnesota State Livestock Sanitary Board; **M. S. Shahan,** head of foot-and-mouth disease research, Pathological Division, BAI, Washington, D. C.; **Dale Sorenson,** University of Wisconsin, Madison; **R. L. West,** secretary and executive officer, Minnesota State Livestock Sanitary Board; and **C. J. Rosell,** St. Paul.

Other University of Minnesota veterinary staff members to appear on the program were **Drs. M. H. Roepke, D. H. Clifford, H. J. Griffiths, Harvey H. Hoyt, R. L. Kitchell, D. G. Low, G. W. Mather, B. S. Pomeroy, J. H. Sautter, A. F. Sellers,** and **Alvin F. Weber.**

s/H. J. GRIFFITHS, *Resident Secretary.*

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Southern Society.—At the September 24 meeting of the Southern Minnesota Veterinary Medical Society, **Drs. Robert Hanson** (Ph.D.), University of Wisconsin, Madison, and **E. H. Nordstrom,** field inspector of the BAI, Mason City, Iowa, discussed vesicular diseases. The following officers were elected: Drs. A. B. Magnusson, Blooming Prairie, president; J. M. Higbee, Albert Lea, vice-president; and G. A. Young, Austin, secretary-treasurer.

s/H. J. GRIFFITHS, *Resident Secretary.*

Missouri

Short Course.—The University of Missouri's twenty-eighth annual short course for veterinarians, under the direction of their new School of Veterinary Medicine, on October 6 and 7, was a success in every way. All of the sessions were held in the University's fine new Memorial Union. Speakers on the program included **Drs. George R. Fowler,** Iowa State College, Ames; **Ray D. Hatch,** University of Illinois, Urbana; **J. P. Carney,** Meridian, Miss.; **H. E. Curry,** state veterinarian, Jefferson City, Mo.; **M. L. Johnson,** Bureau of Animal Industry, Topeka, Kan.; **W. A. Aitken,** editor, AVMA Journals, Chicago; and **A. A. Case** of the University of Missouri. At the final session, **Dr. A. H. Quin** of Kansas City, Missouri, acted as moderator at a panel discussion which must have been of interest. At least it kept a good attendance until a late hour on the second afternoon.

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Meeting Schedule of State Association.—The meeting schedule of the Missouri Veterinary Medical Association has been adjusted. According to new by-laws recently adopted, the regular annual meeting which has always been held during the summer will now be a winter meeting and will alternate from year to year between St. Louis and Kansas City.

St. Louis will be host city to the convention on Feb. 23-24, 1953, at the Hotel Jefferson. The Greater St. Louis Veterinary Medical Association is in charge of local arrangements, with Dr. S. W. Hailer as general chairman.

In addition to Missouri veterinarians, the program is expected to attract a number from Illinois, Indiana, and Kentucky.

s/J. L. WELLS, *Secretary.*

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Southwest Association.—The following speakers addressed the Southwest Missouri Veterinary Medical Association on Sept. 17, 1952, at Dr. T. D. Wills' Veterinary Hospital in Cape Girardeau: **Drs. H. E. Curry,** Jefferson City; **E. F. Ebert,** and **A. A. Case** of the University of Missouri, School of Veterinary Medicine, Columbia; and **Dr. Doehler** of Corn Belt Laboratories.

On September 25, the following speakers appeared on the program: **Drs. H. E. Curry,** Jefferson City; **Stanley Smith** and **M. E. Taylor** of the University of Missouri, School of Veterinary Medicine, Columbia; **E. R. Price,** public health veterinarian, Missouri Division of Health, Jefferson City; and **J. F. Knappenberger,** Ashe Lockhart, Inc., Kansas City.

s/A. H. GROTH, *Secretary.*

New York

State Society.—Approximately 600 members of the New York State Veterinary Medical Society met at the Sagamore Hotel, Bolton Landing, on Sept. 9-12, 1952.

One of the highlights of an outstanding program was the demonstration of the advance in telephone service by the New York Telephone Company, during which calls were made to **General J. A. McCallum,** president of the AVMA, in Washington, D. C.; **Mr. Chas. Travers,** executive secretary of the California Veterinary Medical Association, in San Francisco; and to **Dr. C. D. Van Houweling,** assistant executive secretary of the AVMA, who presented the Association's greetings from the central office in Chicago. The rapidity with which each call was made was timed by a clock for the audience to see and the voices of the persons speaking were heard by all over a public address system.

Other speakers who presented papers at this meeting were Drs. **John L. McAuliff,** Cortland; **George H. Hopson,** chairman, New York State Advisory Committee on Selective Service; **R. F. Korns,** director of the bureau of epidemiology and communicable diseases of the State Department of Health; **D. D. Delahanty,** New York State Veterinary College; **Frank Bloom,** associate pathologist of the State University College of Medicine and a small animal practitioner; **E. J. Hurwitt,** chief of the surgical division, Montefiore Hospital, New York City, and clinical professor of surgery at Columbia University College of Medicine; **H. E. Jensen,** Cleveland, Ohio; **S. G. Penny,** Brooklyn; **William Payne,** medical photographer, Roswell Park Memorial Institute; **J. B. Engle,** Summit, N. J.; **L. W. Goodman,** Manhasset; **E. P. Leonard,** Ithaca; **C. P. Zepp, Sr.,** New York City; **Dean W. A. Hagan** of the New York State Veterinary College; and **Yoshiharu Sekimoto** of Tokyo, Japan, who presented greetings from the Japan Veterinary Medical Association.

The following officers were elected: Drs. Walter D. Way, Westport, president-elect; and W. J. Sellman, Utica, treasurer. Dr. S. S. Miller, Larchmont, will serve as president.

Social activities included a tour of Fort Ticonderoga, the annual golf tournament; skeet shoot, cruise, a first-run motion picture, frankfurter roast, and the annual banquet.

s/J. S. HALAT, *Secretary.*

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New York City Association.—The regular meeting of the Veterinary Medical Association of New York City, Inc., was held at the New York Academy of Sciences on October 1. **Dr. Robert S. MacKellar, Sr.,** presented an engraved gavel to **President Fletcher,** who presided over the meeting.

Miss Edna M. DuBois, senior research assistant, Jackson Memorial Laboratory, Bar Harbor, Maine, presented an illustrated paper on "A Discussion of Some Physical and Mental Abnormalities in the Dog."

The following guests were present: Col. C. W. Betzold, S. Dorfman, W. C. Glenney, F. L. Herchenroder, C. J. Kensler, J. Krakauskas, Leo L. Lieberman, H. B. Lustig, M. H. Milman, John Quatroche, Miss Georgia Sacks, A. Schaffer, and D. W. Johnson.

The business meeting was dispensed with and cocktails and refreshments were served.

s/C. R. SCHROEDER, *Secretary.*

North Carolina

Central Association.—The Central Carolina Veterinary Medical Association met at the O'Henry Hotel in Greensboro, N. Car., on Oct. 8, 1952. **Mr. W. C. King** of Greensboro, a director of the National Chinchilla Association, talked on the chinchilla industry. After his talk, **Dr. John Chambless,** Lexington, Ky., presented a paper on diseases of the chinchilla.

s/CLYDE W. YOUNG, *Resident Secretary.*

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Piedmont Association.—The Piedmont Veterinary Medical Association met at Mulls Motel in Hickory on Sept. 26, 1952. **Dr. G. R. Armstrong** gave a review of the papers which were presented at the state meeting.

s/CLYDE W. YOUNG, *Resident Secretary.*

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Personal.—Dr. R. W. Smith of Onslow donated his time to blood test the calves entered by Onslow youngsters in the New Bern and Wilmington Junior Dairy Cattle Shows. Without this test, the calves could not be entered in the show.

s/CLYDE W. YOUNG, *Resident Secretary.*

Pennsylvania

State Association.—During the business session of the Pennsylvania State Veterinary Medical Association, on October 8-10, a resolution was passed on the sterilization of garbage, and a board of governors was established to consider and transact business in the interim between regular trustees' meetings.

The following officers were elected: Drs. S. F. Scheidy, West Point, president; C. J. Hollister, Montrose, president-elect; R. G. Little, Williamsport, first vice-president; D. C. Service, Elwood City, second vice-president; Sherman Ames, Sr., Easton, third vice-president; R. D. Snyder, Upper Darby, corresponding secretary; and E. T. Booth, Philadelphia, treasurer.

s/R. D. HOFFMAN, *Resident Secretary.*

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"The Bryans of Bucks County."—This is the title of a featured article in the Sept. 25, 1952, issue of *Hoard's Dairyman.* It says, "The Bryans, whose herd of registered Guernseys was one of

the finest in the state, achieved success in rearing a family, too." Two of their six sons are well known in the veterinary profession, and both specialized in dairy cattle practice. Dr. Claude Bryan was dean of the School of Veterinary Medicine at Michigan State College until his untimely death in July, 1951. Dr. Harold Bryan is a member of the faculty of the College of Veterinary Medicine at the University of Illinois.

Washington

State Association.—The Washington State Veterinary Medical Association held their Annual meeting at the Chinook Hotel in Yakima September 26 and 27. Seventy-three veterinarians registered and many of them brought their wives. Everyone enjoyed a splendid program.

Dr. Lee Seghetti of Bozeman, Mont., talked on cattle and sheep diseases. **Dr. Mark Morris** of Topeka, Kan., talked on small animal nutrition. **Dr. A. E. Crouse** gave some information regarding the work of the State Department of Agriculture. **Mr. Allan Rogers** of Ellensburg appeared on the program and expressed the cattleman's viewpoint.

The meeting was highlighted by a dinner and dance Friday evening. **Dr. E. E. Stone**, the new dean of the College of Veterinary Medicine at Pullman, was the featured speaker.

At the regular business meeting Saturday morning, **Dr. Peter MacKintosh** of Yakima reported thoroughly on his experiences as a delegate to the AVMA. He also reported on brucellosis. This report was very well received.

Officers elected for the coming year are: Drs. P. M. Hinze, Carnation, president; Robert Burch, Seattle, vice-president; J. L. Ellis, Olympia, secretary-treasurer. The trustees are: Drs. Peter G. MacKintosh, E. E. Wegner; Seattle; James Kraft, Seattle; Wm. Harris, Puyallup; T. Robert Phelps, Vancouver; LaMar Gaw, Oak Harbor; and John Stevens, Sequim. Also included as trustees are Dr. A. E. Crouse to represent the State Department; Dr. Fred Shigley, the federal office; and Dr. E. C. Stone, the College of Veterinary Medicine.

s/J. L. ELLIS, *Secretary.*

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Veterinary College Buildings Named to Honor Former Deans.—On October 26, dedication ceremonies were held at Washington State College at which time the two buildings housing the College of Veterinary Medicine were named in honor of two former deans. The veterinary classroom building was named Wegner Hall for Dr. E. E. Wegner who headed the school from 1919 to 1947, and the veterinary clinic building was named for Dr. J. E. McCoy, longtime faculty member (*see* the July JOURNAL, p. 71) and later dean, now dean emeritus.

Plaques in honor of the two former deans were unveiled during the exercises, which they attended.

West Virginia

State Association.—The twenty-third annual meeting of the West Virginia Veterinary Medical Association was held at the Kanawha Hotel, Charleston, on Oct. 12-13, 1952, with an attendance of 40 members and guests.

New officers of the West Virginia Veterinary Medical Association are (left to right) Drs. James P. Bailey, president; Elvin R. Coon, secretary-treasurer; and Victor Miller, vice-president.

The following scientific program was presented: **Dr. S. E. Hershey,** Charleston, "Report on AVMA House of Representatives"; **Dr. R. W. Brown,** U. S. BAI, Washington, D. C., "Staphylococcic Mastitis"; **Dr. W. F. Hoffman,** Pittsburgh, Pa., "Small Animal Practice" and "General Topics of Interest"; **Dr. George Ott,** Fromm Laboratories, Grafton, Wis., "Virus Diseases." Dr. Brown also presented a film on "Vesicular Exanthema in Swine."

The newly elected officers of the association are Drs. James P. Bailey, Bluefield, president; Victor H. Miller, Charleston, vice-president; and Elvin R. Coon, Charleston, secretary-treasurer.

s/ELVIN R. COON, *Secretary.*

Wisconsin

Course in Biology of Infectious Diseases.—A Course in the Problems in the Biology of Infectious Diseases is offered during the fall semester, 1952, at the University of Wisconsin, by Sir Frank MacFarlane Burnet, M.D., Ph.D., F.R.A.C.P., F.R.S., director of the Walter and Eliza Hall Institute for Medical Research, Melbourne, Australia; and professor of experimental medicine at the University of Melbourne.

Sir MacFarlane's brilliant researches during the past several decades have contributed

greatly to a better knowledge of disease agents, especially viruses, and to a clearer understanding of infectious diseases as biological phenomena. His early work with bacteriophagy initiated extensive critical study of the mechanism of virus infection. His more recent contributions have established a rationale for the study and interpretation of the impact of genetics on the host-parasite relationship.

s/C. A. BRANDLY.

MARRIAGES

Mr. Oliver Inskip and Victoria M. Sperber (MRCVS '48), both of Kamloops, B. C., were married at Kamloops on Sept. 11, 1952.

BIRTHS

Capt. (COR '49) and Mrs. Stanley Glick, Boston, Mass., announce the birth of a son, Stephen Michael, on Aug. 19, 1952.

Dr. (OSU '51) and Mrs. Richard E. Pliske, Michigan City, Ind., announce the birth of a son, Richard Douglas on Aug. 26, 1952.

DEATHS

★**Gerardo Arroyo** (OSU '49), 34, Shelbyville, Ind., died July 22, 1952. A native of Puerto Rico, Dr. Arroyo had worked for the Bureau of Animal Industry for two years after receiving his D.V.M. degree, and then established a private practice in Shelbyville in September, 1951. He is survived by his widow and two children. Dr. Arroyo was a member of the AVMA.

★**Harold G. Bond** (OSU '15), 62, Columbus, Ohio, died June 4, 1952. Dr. Bond was a member of the Ohio State Veterinary Medical Association and of the AVMA. He is survived by his widow.

★**Emmett W. Cantrall** (WSC '36), 48, Ukiah, Calif., died Sept. 26, 1952, of undulant fever and complications. Dr. Cantrall practiced in Grants Pass from 1938 to 1944, where he served on the Oregon State Veterinary Medical Examining Board. He later practiced in Alturas, Calif., and Union, Ore. He is survived by his widow, two daughters, and a son. Dr. Cantrall was a member of the AVMA.

★**Harold M. Halverson** (CVC '07), 71, Yankton, S. Dak., died July 8, 1952. Dr. Halverson had practiced in Yankton for more than forty years. He had retired recently due to ill health. He was admitted to the AVMA in 1909.

H. H. Hamlin (HAR '01), Canton, Conn., died recently. Dr. Hamlin had been in general practice but had retired some time ago.

William Hooton (MCK '08), 80, Danville, Ill., died July 2, 1952. Dr. Hooton was a general practitioner.

George H. Locke (CAL '98), Lockeford, Calif., died July 5, 1952. Dr. Locke had been a member of the AVMA. He is survived by his widow and two daughters.

★**J. A. McKitterick** (KSC '22), 53, Lee's Summit, Mo., died Sept. 17, 1952. Dr. McKitterick was a general practitioner. He was a member of the Missouri and Kansas City Veterinary Medical Associations and of the AVMA.

Chauncey E. Moorman (GR '17), 59, Denver, Colo., died July 29, 1952. Dr. Moorman was employed by the U. S. Bureau of Animal Industry. He had served with the Veterinary Corps during World War I.

★**Lester D. Nowell** (STJ '15), 62, Humboldt, Tenn., died Aug. 16, 1952. Dr. Nowell was a member of the Veterinary Reserve Corps. He was a member of the Tennessee Veterinary Medical Association and was admitted to the AVMA in 1916.

Paul Quilty (KCV '05), 78, Lake Charles, La., died recently. An obituary appears on page 508 of this JOURNAL.

Charles E. Reed (IND '10), Dunkirk, Ind., died in August, 1952. Dr. Reed had practiced in Dunkirk for more than forty years. He specialized in poultry practice.

David F. Seed (GR '05), 80, Minot, N. Dak., died Aug. 10, 1952. A general practitioner, Dr. Seed had retired recently. He was for several years a member of the North Dakota State Livestock Sanitary Board.

★**Russell L. Smith** (IND '17), 58, Kentland, Ind., died Sept. 22, 1952. He practiced in Winchester, Ind., a year before entering World War I as a lieutenant in the Veterinary Reserve Corps. After his discharge, he established a practice in Kentland where he was actively engaged until a few weeks before his death. Dr. Smith was a member of the Indiana and Northwestern (Ind.) Veterinary Medical Associations and of the AVMA. He is survived by his widow and one daughter.

W. Bruce Teller (COL '39), 35, Denver, Colo., died Aug. 3, 1952, from a cerebral hemorrhage. Dr. Teller was a small animal practitioner.

★**F. A. Walters** (MCK '16), 68, Lemont, Ill., died June 10, 1952. Dr. Walters had practiced in Lemont for more than thirty-five years. He was a member of the Illinois Veterinary Medical Association and of the AVMA.

★**Hiram L. Winder** (CVC '13), 65, Sheridan, Ill., died May 23, 1952. Dr. Winder was employed by the U. S. Bureau of Animal Industry. He was a member of the National Association of Federal Veterinarians and of the AVMA.

Herman E. Zimmerman (KCV '08), 71, Kansas City, Kan., died Aug. 30, 1952, of a heart attack. Dr. Zimmerman was owner of the American Veterinary Laboratories and a former partner in the Standard Serum Company for twenty years. He is survived by his widow, two sons, and a daughter.

★Indicates members of the AVMA.

Feed it for a week and see!

NEW DRY-TYPE FOOD WITH

Flavor dogs can't Resist!

...and you can recommend it without qualification!

How often have you recommended a dry dog food and added hopefully: "I'm pretty sure he'll eat it"?

From now on, have no such reservations! You can recommend this new food—Swift's PARD MEAL—with confidence that dogs will prefer it to any other meal-type food they've ever tasted, and will *stay* with it. Comparative feeding tests show a startling taste preference for this new product.

It is packed with extra amounts of rich meat fat for super-energy, fuller nutrition. Contains Aureomycin to keep the dog "on feed", promote good appetite.

Homogenized — cleaner, quicker to feed, won't flake or powder. Available in 2 and 5 lb. cartons, 25 and 50 lb. bags.

(COMING MEETINGS — *continued from p. 30*)

p.m. in the Hotel Rodney, Wilmington, Del. Harold Roberts, Paper Mill Road, Newark R3, Del., secretary.

New York City, Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63 St., New York City. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday evening from September through June, at the Casa Mana Restaurant, Cedar Lane, Teaneck, N. J. Robert R. Shomer, 1680 Teaneck Road, N. J., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Tom Hagan, Gen. Del., Escalon, Calif., secretary.

Oklahoma County Veterinary Medical Association, the second Wednesday of every month except July and August. W. C. Schilb, 4312 N. W. 23rd St., Oklahoma City, Okla., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Clark Stillinger, 1742 E. Holt Ave., Pomona, Calif., secretary.

Orange County Veterinary Medical Association, bi-monthly. Donald E. Lind, 2643 N. Main, Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. P. H. Hand, Box 1035, Millbrae, Calif., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. C. N. Copeland, Hickory, N. Car., secretary.

Pima County (Arizona) Veterinary Medical Association, the third Wednesday of each month, in Tucson. R. W. Adami, 2103 S. 6th Ave., Tucson, Ariz., resident secretary.

Portland (Oregon) Veterinary Medical Association, the second Tuesday of each month, in the Auditorium of the Upjohn Company. Robert L. Hawley, 1001 N. W. Fourteenth Ave., Portland, Ore., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. John McChesney, 40 6th St., Petaluma, Calif., secretary.

Roanoke-Tar (N. Car.) Veterinary Medical Association, the first Friday of each month, time and place specified monthly. B. H. Brow, Weldon, N. Car., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. S. M. Foster, 430 College, Woodland, Calif., secretary.

Saginaw Valley Veterinary Medical Associa-

(*Continued on p. 34*)

(COMING MEETINGS — *continued from p. 32*)

tion, the last Wednesday of each month. H. W. Harper, Flint Health Department, Flint, Mich., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. Warren J. Dedrick, 904 S. Lemon, El Cajon, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, the second Friday of even months. Joe Ridgway, 1784 Thompson Blvd., Ventura, Calif., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. R. W. Sprowl, 11756 San Vicente Blvd., Los Angeles 49, Calif., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. A. Majilton, 1093 N. E. 79th St., Miami, Fla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month, in Director's Parlor of the Brookside State Bank, Tulsa, Okla. John Carnes, Muskogee, Okla., secretary.

Foreign Meetings

Fifteenth International Veterinary Congress. Stockholm, Sweden, Aug. 9-15, 1953. Dr. L. de Blieck, Soestdijkseweg 113N., Bilthoven, Netherlands, secretary, Permanent Committee. (U. S. Committee: Dr. W. A. Hagan, N. Y. State Veterinary College, Ithaca, N. Y., chairman; Dr. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., secretary.)

Dog Training Club to Aid National Dog Welfare Guild

In order to aid in the current drive for funds to support the work of the National Dog Welfare Guild, official sponsors of National Dog Week, all proceeds of the ninth annual obedience (benched) trial of the First Dog Training Club of Northern New Jersey on November 15, at Teaneck, N. J., were donated to that worthy nonprofit organization devoted to the welfare of all dogs.

It is hoped that this initial step made by this organization will be followed by other obedience and show-giving clubs.

The First Dog Training Club of Northern New Jersey, one of the country's oldest obedience clubs, had a record-breaking entry of 321 dogs at last year's show and the entry was not disappointing this year.

Veterinarians handle up to 30% more calls daily with...

Motorola 2-Way Radio

Instant Contact En Route Saves Time, Increases Calls, Cuts "Dead" Mileage

Now you can find *extra hours* every day using Motorola radio for contact with home or office. Start your daily rounds earlier . . . set up schedules *en route* . . . radio first-aid instructions to clients . . . and handle up to 30% more calls. No tests to pass, no technical skill needed, just push a button and you're on the air!

Expert Motorola engineers supervise the installing of your sets—and from the start you get sure-action communication with long-lasting reliability. Motorola guarantees superior performance . . . obsolescence-proof design . . . time-tested durability. Write today for this prompt, friendly engineering service.

Motorola

Communications & Electronics Division
4545 Augusta Blvd., Chicago 51, Illinois
Rogers Majestic Electronics Ltd., Toronto, Canada

Uni-Channel Mobile Radio. Sealed-in selectivity eliminates 15 tuning adjustments forever.

CLASSIFIED ADVERTISEMENTS

Twenty-five words or less, $2.50; 8 cents for each additional word. Replies sent in care of the JOURNAL, 25 cents extra.

Remittance must accompany order.

Deadline for want ads 8th of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

WANTED VETERINARIAN—to assist in a busy mixed practice. Good salary and possible future for a man who is willing to do the high caliber job a discriminating clientele demands. Recently built hospital with complete facilities for small and large animal surgery. Address "Box Z 1," c/o JOURNAL of the AVMA.

VETERINARIAN WANTED—in a small animal hospital in Chicago. Must have small animal experience and graduated from an AVMA-approved school. Good salary and apartment furnished. State salary expected and experience in first letter. Address "Box Z 22," c/o JOURNAL of the AVMA.

WANTED—young enterprising veterinarian with California license, small animal practice in well-established veterinary hospital. Good salary and working conditions. Address Dr. F. H. Saunders 336 E. Lafayette St., Stockton 3, Calif.

The state of Indiana has expanded its program in Brucellosis control. There are several new positions for veterinarians to act as field supervisors. Starting salary $4,500 plus $7.20 per diem, and 6 cents mileage. Apply: Dr. James B. Henderson, Assistant State Veterinarian, State Board of Health Building, 1330 W. Michigan St., Indianapolis, Ind.

WANTED VETERINARIAN—for suburban Chicago small animal hospital. Excellent opportunity both from a financial and experience standpoint. Applications will be judged solely on medical ability and personality. Write Dr. Myron Bernstein, Glencoe Animal Hospital, Box 87, Glencoe, Ill.

WANTED VETERINARIAN—interested in small animal practice in Connecticut. Good salary and possible future partnership. Apartment available. State qualifications and salary required in first letter. Address "Box B 3," c/o JOURNAL of the AVMA.

WANTED—experienced veterinarian able to operate small animal hospital. Attractive salary and commission. Must have Maryland license. Small apartment available. Address "Box B 12," c/o JOURNAL of the AVMA.

(Continued on p. 38)

Chloresium chlorophyll

a healing agent of **proved** *effectiveness*

Chloresium®

Veterinary Ointment and Solution

In cases of resistant healing, use water-soluble chlorophyll therapy . . . proved in human medicine . . . now available to the veterinarian. In a wide range of wounds, ulcers, burns and dermatoses in large and small animals, CHLORESIUM VETERINARY OINTMENT and SOLUTION:

- accelerate healing
- control secondary infection
- relieve itching and discomfort
- deodorize malodorous lesions
- are nontoxic, bland and soothing

In a controlled study[1] of 1372 induced wounds and burns, a 24.9 per cent reduction in healing time was noted in chlorophyll-treated animals when compared to controls. In a clinical study[2] of its veterinary uses, CHLORESIUM was termed "a solution to the problem of tissue repair, providing a nontoxic, nonirritating cell-stimulating agent combining deodorizing and therapeutic virtues."

deodorize with Chloresium Veterinary Tablets

For effective control of mouth, breath and body odors, water-soluble chlorophyll destroys odors at their source within the body . . . provides control for pathologic as well as normal odors.

Chloresium Veterinary Products are supplied in the following sizes:

OINTMENT—1 oz. and 4 oz. tubes, 1 lb. jars
SOLUTION—2 oz. and 8 oz. bottles
TABLETS—bottles of 100

CHLORESIUM Veterinary Products are sold only to graduate veterinarians—available through ethical veterinary distributors.

VETERINARY DIVISION

1. Smith, L. W., and Livingston, A.E.: Am. J. Surg. 67:358, 1945.
2. Schaffer, J. D.: North Am. Vet. 31:817, 1950.

Rystan company inc., MOUNT VERNON, N. Y.

(CLASSIFIED ADS — *continued from p. 36*)

WANTED VETERINARIAN—basic producer of feed fortification products seeks veterinarian interested in specializing in nutrition. Prefer man with large animal experience. Position involves developing new feed formulas, formula counseling work and "trouble shooting" for feed manufacturers. Will work in close conjunction with sales department, which will involve considerable customer contact both in person and by correspondence. Public speaking ability will be an asset. Previous experience in nutrition is not a requisite as we will provide intensive training in this field. This is a splendid position in the Chicago headquarters of an old established company doing an international business. It offers a secure future with plenty of opportunity for progress. Write fully of your training and experience. Enclose recent snapshot, if convenient. Your confidence will be respected. Address "Box B 1," c/o JOURNAL of the AVMA.

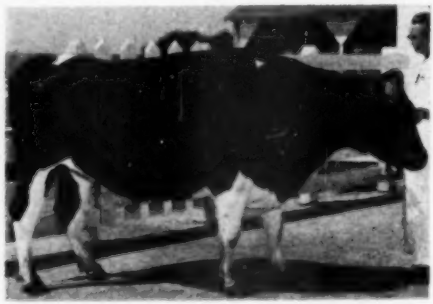
Remittance must accompany order

WANTED VETERINARIAN—to assist in a busy mixed practice. Good salary and future for man who is willing to do high caliber job. Recently built hospital with complete facilities for small and large animal surgery. Address "Box B 6," c/o JOURNAL of the AVMA.

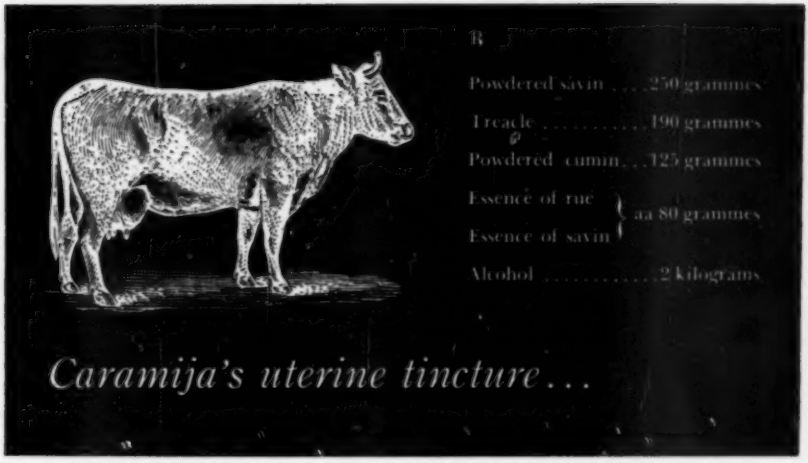
(*Continued on p. 40*)

Giant Holstein-Friesian Gives Blood to Save His Fellows

"Big Bill," a giant Holstein-Friesian steer at the biological farm of Jensen-Salsbery Laboratories, Kansas City, Mo., has helped save the lives of



thousands of cattle in every state and many foreign countries. Docile Big Bill, shown here with 6-ft. Alva Wilson, laboratory technologist, has contributed more than 2,000,000 cc.—2,000 qt.—of his blood during the last seven years. Blood was processed by Jensen-Salsbery into lifesaving, shipping fever antiserum for use by veterinarians. Big Bill has been bled 262 separate times.



A dose of 100 grams of this tincture given in two liters of a savin infusion was once reported to be an effective emmenagogue for the expulsion of retained placenta in cattle. (Fleming, G.: Textbook of Veterinary Obstetrics, New York, W. R. Jenkins, 1892.)

ECP*

another product of **Upjohn Research** *for the veterinarian*

is the product of choice for the modern veterinarian. This new hormone, estradiol cyclopentylpropionate, enhances uterine tone and motility for the rapid and safe expulsion of the retained placenta. Its use for this purpose is detailed in a folder available to the veterinarian on request.

*Trademark

DEPARTMENT OF VETERINARY MEDICINE

THE UPJOHN COMPANY, KALAMAZOO, MICHIGAN

(CLASSIFIED ADS — *continued from p. 38*)

OPPORTUNITY OFFERED—a semi-retired management engineer is expanding his holdings in small animal hospitals, and offers an opportunity to a veterinarian who has had 3 to 5 years' small animal hospital experience, some of which should be in a lead doctor's position. He must be willing to work and follow the business and management rules now in force. (These are ethical and patterned after human hospital experience). For this he will be given a good percentage of the net profits plus, after proving himself, an opportunity to own a business. This opportunity is in Southern California; a California license is necessary. (Examinations given in January). In reply give age, marital status, experience, recent bust photo, and average earnings for the past two years. Do not reply unless you are willing to WORK toward owning a business of your own. Address "Box B 2," c/o JOURNAL of the AVMA.

WANTED VETERINARIAN—as assistant in northern New England country practice, 80% large animals. Must be willing worker. Address "Box B 10," c/o JOURNAL of the AVMA.

WANTED ASSISTANT VETERINARIAN—mixed practice, mostly dairy cattle in Willamette Valley, Oregon. Attractive commission. Need help by first of year, if possible. Send particulars. Address "Box B 15," c/o JOURNAL of the AVMA.

Wanted—Practices

WANTED TO BUY—good lucrative practice, predominantly small animal. Experienced. Can make large cash down payment if price is right. Address "Box Z 10," c/o JOURNAL of the AVMA.

PRACTICE WANTED—Experienced California-licensed veterinarian desires to buy or lease active small animal hospital in California. Write full details in first reply. Address "Box B 9," c/o JOURNAL of the AVMA.

(*Continued on p. 46*)

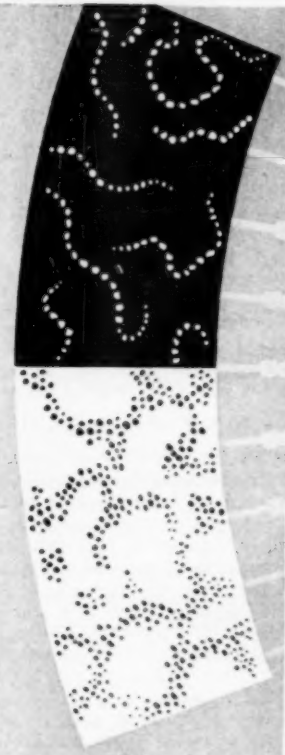
Dr. Geyer, Manager, Columbus Branch, Jen-Sal Laboratories

On Oct. 1, 1952, Dr. H. G. Geyer (OSU '36), Columbus, Ohio, became manager of the Columbus branch of the Jensen-Salsbery Laboratories. He comes to his new position from the Ohio De-

Dr. H. G. Geyer

partment of Agriculture, where he had been chief of the Division of Animal Industry for the past five years. Dr. Geyer, serving with the Armed Forces from 1940 to 1946, reëstablished his private practice, when separated from the service, at Grove City, Ohio, and practiced until late in 1947 when he became associated with the Ohio Department of Agriculture. Dr. Geyer was married in 1937 and has four children. He is active in the AVMA, the Ohio V.M.A. and the U. S. Livestock Sanitary Association.

with this antibiotic combination you can
control a wide variety of bacterial infections—
quickly...safely...economically



schenley

SYNCROBIN

Trademark

[PENICILLIN–DIHYDROSTREPTOMYCIN]

in two potencies

SYNCROBIN* (1.0). A single-dose vial contains: 300,000 units procaine penicillin G; 100,000 units potassium penicillin G; and 1 Gm. dihydrostreptomycin base as dihydrostreptomycin sulfate. In single vials or cartons of 10, providing 1, 5, or 10 doses each.

SYNCROBIN (0.5). A single-dose vial contains: 300,000 units procaine penicillin G; 100,000 units potassium penicillin G; and 0.5 Gm. dihydrostreptomycin base as dihydrostreptomycin sulfate. In single vials or cartons of 10, providing 1 or 5 doses each.

For udder instillation **... PENICILLIN — DIHYDROSTREPTOMYCIN OINTMENT VETERINARY SCHENLEY.** Contains 100,000 units potassium penicillin G and 100 mg. dihydrostreptomycin base as dihydrostreptomycin sulfate, in "ready to use" instillation tubes; cartons of 10.

For additional information on these and other Schenley veterinary products, write to:

SCHENLEY LABORATORIES, INC.
LAWRENCEBURG, INDIANA

schenley

Correspondence

Sept. 30, 1952

Editorial Department:

I am sorry that I feel myself compelled to differ with Dr. Margaret Sloss . . . in the current (October JOURNAL (p. 284) that the first two women veterinarians to graduate in the United States, graduated in 1910.

I happen to know, because I was there, that at least one member of the fair sex graduated from McKillip Veterinary College in 1904. She was Dr. Mignon Nicholson, as I'm sure any class picture of that year's McKillip class will show.

This is probably not too important, except that I always like to see the records straight. It should not be very difficult to verify even though the lady has been dead these many years and the School no longer exists.

Sincerely,
s/C. H. Faukes,
Resident Secretary.

P. S. On reflection, I find myself a bit hazy as to the exact year. It may have been 1903. But there is no question but that it was 1904 or 1903.

• • •

The following are answers to inquiries pertaining to the interpretation of the Code of Ethics which have been received by the AVMA and referred to the Committee on Ethics for reply. Since the problems cited may be of interest to others, the replies are being published. Dr. Haigler was chairman of the Committee when the first inquiry was received. Dr. Winkler is the present chairman.—ED.

Is it ethical for a veterinarian to advertise in a telephone directory his boarding facilities, if he does not use his name but states his telephone number?

March 22, 1952

Dear Doctor:

Your letter regarding the propriety of a veterinarian advertising boarding facilities under the heading of "kennels" in the classified telephone directory has been referred to the Committee on Ethics.

Many veterinarians who operate dog and cat hospitals also board animals. This, we believe, is a man's own business. Some veterinarians operate separate boarding kennels while others board pets in their hospitals.

In the case you mentioned, a veterinarian who

(Continued on p. 44)

Rx—for sturdier, healthier spring calves

1—Fortify grain rations, all during gestation, with Via-D-Mineral Supplement. Provides 64,000 USP units vitamin D_2 per lb., plus other vitamins, iodine, major and trace minerals — vitally necessary feeds too often deficient, in sufficient amounts, for full scale production and reproduction. Via-D-Mineral helps dams keep up their own strength and vigor, maintain milk flow, and build the fetuses for sturdy, healthy calves.

2—Add VpC RIB-AD (with its 104,320 USP units vitamin A per lb., plus other vitamins) during the dry period to supply potent, colostrum-rich milk to the new-born calf.

3—Feed dam's milk for the first 3 days, then offer this better calf starter, along with cow's or synthetic milk.

Claims 100% Reproduction

A dairyman at Shelburne, Ontario, Canada, states he never could save more than 1 calf per year from his 12 cow herd until, on the advice of his veterinarian, he adopted Vitamineral's safer plan for sturdier calves. He says he has, this year, 12 of the healthiest spring calves in the entire province.

Calf Starter Formula

200 lbs. dehydrated alfalfa meal, 17%
400 lbs. cracked yellow corn
200 lbs. crushed oats
200 lbs. linseed meal
700 lbs. soybean oil meal
200 lbs. wheat standard middlings
80 lbs. Via-D-Mineral Supplement
20 lbs. salt

2000 lbs.

APPROXIMATE ANALYSIS: *Protein, 24.0%; fat, 3.5%; fiber, 8.0%.*

Write for detailed data on this veterinarian approved pre- and post-parturition calving plan.

Vitamineral Products Co. (Since 1915) Peoria 3, Ill.

(CORRESPONDENCE — *continued from p. 42*)

has an advertisement under the listing of "kennels" does not mention his hospital or his name, but uses his office telephone number. We do not believe this can be construed as a violation of our Code of Ethics. On the other hand, it is not proper to use the doctor's name or name of his hospital in such a listing. To do so, would be advertising under a different listing.

Sincerely yours,
s/S. W. HAIGLER, *Chairman,*
AVMA Committee on Ethics.

• • •

Is it ethical for a veterinarian to operate a boarding kennel in connection with his hospital?

Sept. 15, 1952

Dear Doctor:

I have the letter in which you inquire concerning the operation of a boarding kennel in connection with your hospital. There is nothing in the Code that would conflict with the operation of a boarding kennel, but it does have something to say concerning advertising.

I refer you to paragraph 12 of the Code in which it states, "It is . . . unethical [to advertise] any service within the scope of veterinary practice."

In paragraph 21 it is stated, "Display signs of reasonable size and dimensions on veterinary hospitals are not regarded as objectionable, provided they do not announce special services . . . ."

The Cincinnati Veterinary Medical Association decided some time ago to eliminate all mention of boarding facilities from hospitals and telephone directories, and I think it was a splendid procedure to follow because it eliminates conflict with established boarding kennels that are run by the laity and makes for a better understanding and a closer coöperation between the two.

In conclusion, let me suggest that, if you operate the boarding kennel, probably you will find that most of your boarding contacts will be made in your clinic and by phone inquiries. Thus, perhaps it is best to leave the advertisement of such things to the boarding kennels, the field where it belongs.

Please feel free to call on this committee any time you desire.

Sincerely,
s/J. A. WINKLER, *Chairman,*
AVMA Committee on Ethics.

If

If you can smile when all within you
  Is refusing with fatigue and strain;
If you can answer telephone and door bells,
  While Junior cries with all his might and main;
If you can keep the books, the practice build,
  Assist in surgery, yet enjoy your life;
You are a member of that exclusive guild,
  Jill of all trades — the veterinarian's wife!

—The Maine Veterinarian

Notice to Contributors

Journal of the AVMA

and the

American Journal of Veterinary Research

Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals.

Manuscripts.—Manuscripts must be typewritten, double-spaced, and the original, not the carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise and to the point. Short, simple sentences are clearer and more forceful than long, complex ones. Footnotes and bibliographies also should be typed double space and should be prepared in the following style: name of author, title of article, name of periodical with volume, month (day of month, if weekly), and year.

Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the Journals with a minimum of reduction. Photomicrographs which cannot be reduced should be marked for cropping to 1-column or 2-column width. Drawings should be made clearly and accurately in India ink on white paper. Figures appearing on graphs or charts should be large enough to allow for reduction necessary for the chart or graph to fit on Journal pages. All illustrations should bear the name of the author on the back.

Tables.—Tables should be simple. Complex tables are not conducive to perusal. It is wiser to summarize complex material rather than to attempt to tabulate it.

News.—Secretaries of associations and readers are requested to send us announcements of meetings and news items.

Anonymous Letters.—Anonymous communications, of whatever nature or purpose, to the JOURNAL or to the Association will not be published or referred for consideration to any Association official or committee.

AMERICAN VETERINARY MEDICAL ASSOCIATION

600 So. Michigan Avenue

Chicago 5, Illinois

(CLASSIFIED ADS — *continued from p. 40*)

WANTED TO BUY OR LEASE—small animal hospital in Indiana, Ohio, or Michigan. Experienced. Write full details. Address "Box B 14," c/o JOURNAL of the AVMA.

PRACTICE WANTED—desire to buy or lease busy mixed practice in the northeast or will consider partnership. Am a married veteran and graduate of an eastern school. Address "Box B 16," c/o JOURNAL of the AVMA.

Wanted—Positions

European veterinarian, graduated in Germany, 36 years of age, married, 3 years of experience in this country looking for position as assistant in small or mixed animal practice. Address "Box B 4," c/o JOURNAL of the AVMA.

Wanted to Buy

WANTED—good used set of equine dental instruments and speculum. Address "Box B 7," JOURNAL of the AVMA.

For Sale or Lease—Practices

FOR SALE—due to death, veterinary hospital doing wonderful business. Other income with building. Or veterinarian with Calif. license to work. Mrs. A. E. Joseph, 10523 Long Beach Blvd., Lynnwood, Calif., tel. LOraine 6-8091.

(*Continued on p. 48*)

—Gaines Dog Research Center

This striking study of a Basset Hound by Douglas Cole, Notre Dame University student, won for him the top prize of $250 in the noncamera club member classification of the Gaines Dog Research Center's 1952 dog photo contest.

C.S.C. Veterinary Products Manager Named

Mr. Donald A. Hoff has been appointed veterinary products manager of C.S.C. Pharmaceuticals, a division of Commercial Solvents Corporation, according to an announcement by R. L. Rice, sales manager.

Mr. Hoff's headquarters are at 105 S. 7th St., Terre Haute, Ind., to permit his working closely with Raymond C. Klussendorf, D.V.M., director of Veterinary Medical Services at the company's Research Center in Terre Haute. Dr. Klussendorf is in charge of coördinating medical and clinical research.

(CLASSIFIED ADS — *continued from p. 46*)

FOR SALE OR LEASE—to veterinarian with small animal experience capable of managing busy practice. New, fully equipped hospital in New York State. Owner being called into service. Address "Box X 10", c/o JOURNAL of the AVMA.

FOR SALE OR LEASE—with option to buy. Southern California small animal hospital now at one man capacity. No real estate. Low price, lenient terms. Address "Box W 17," c/o JOURNAL of the AVMA.

FOR SALE—Well-established small animal practice in one of the choice spots in central coastal California. Practice built on careful work. Is not recommended for an inexperienced man, but would be a pleasant practice for the right man. $15,000 includes all equipment, normal operating inventory, and long lease on buildings. Address "Box B 5," c/o JOURNAL of the AVMA.

FOR SALE—fully equipped small animal practice in Texas. Large animal potential good. Excellent equipment. Nets $600 per month and will grow. Will sell at inventory which is $3000 cash — no real estate. Write for details. Address "Box B 8," c/o JOURNAL of the AVMA.

Remittance must accompany order

FOR SALE OR LEASE—beautiful new home and clinic. Mixed practice; expansion unlimited. Southern California resort town. Terms. Address "Box B 11," c/o JOURNAL of the AVMA.

(*Continued on p. 52*)

Pitman-Moore Expansion Program

In the expansion program of the Pitman-Moore Division of Allied Laboratories, Inc., are two new buildings near Zionsville, Ind.

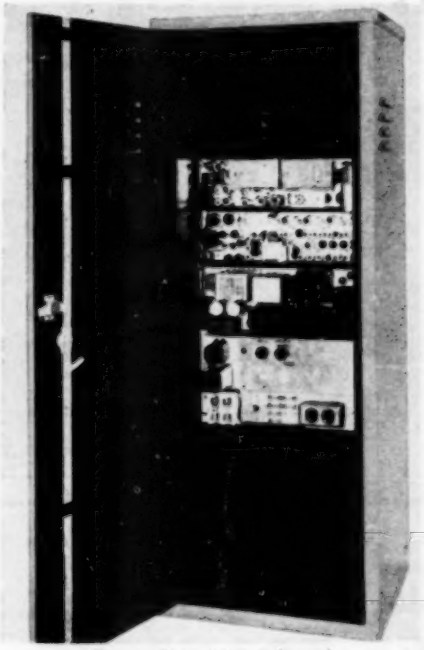
One of these is a new virus-research building, now being erected on the Pitman-Moore Research Farm, 2 miles south of Zionsville. The other, believed to be the country's largest installation for the production of dessicated or vacuum-dried biological products, is located on the spacious grounds of the Pitman-Moore Biological Laboratories, 1¼ miles north of the research farm.

The virus-research building is being erected as a result of the great advances recently made in the prevention and control of virus diseases, and the need for increased knowledge concerning them, such as hog cholera, swine erysipelas, infectious canine hepatitis, canine and feline distemper.

The new building at the biological laboratories was erected for the production of Swivax, the recently introduced vacuum-dried, rabbit-origin, hog cholera vaccine. It was completed at a cost of $1 million.

Motorola's New Base Station

Motorola's recently announced line of 450 to 470 Mc. two-way radio equipment has been complemented by the introduction of a remotely controlled base station.



The new base station is housed in a weather-proof cabinet.

This newly released equipment is used as an automatic relay station to increase the area of operations of a base-to-mobile communications system or to extend the length of the signal path between the end points of a point-to-point radio relay system. The equipment is also used when it is to be installed in a location some distance from the point of audio termination. Such a condition might be dictated by a high ambient noise level or poor signal propagation characteristics at the most convenient location. Proper location of receiver and transmitter may increase the effectiveness of a system many times.

The new base station is housed in a weather-proof cabinet suitable for pole mounting, the same cabinet successfully employed in conjunction with Motorola's 25-50 Mc. and 152-174 Mc. remotely controlled base station.

The components of the new base station include the Sensicon receiver circuit, the Permakay Filter, Instantaneous Deviation Control, and the Capacitance Discriminator.

(CLASSIFIED ADS — *continued from p. 48*)

FOR SALE OR LEASE—with option to buy, modern, fully equipped small animal hospital located in fast growing community of Maryland. Address "Box B 13," c/o JOURNAL of the AVMA.

FOR SALE—small animal hospital in Cleveland. AAHA member. Excellent building; latest equipment; 120 cages. $50,000 down payment required. Dr. H. E. Jensen, 2168 S. Green Road, University Heights 21, Ohio.

FOR SALE—growing practice in Richmond, Va. Phone or write Dr. J. J. Fielder, Route 11. About to be drafted.

FOR SALE—60-40 large and small animal practice, irrigated desert area, California. Large animal mostly beef (feeder) cattle. Sale includes home and small hospital. Reasonable. Terms. Address "Box B 18," c/o JOURNAL of the AVMA.

FOR SALE—established small animal hospital in New Jersey. Real estate optional. Excellent opportunity for experienced veterinarian. $15,000 to handle. Address "Box B 19," c/o JOURNAL of the AVMA.

Miscellaneous

Antiseptic applicator fitting 40-cc. Shikles syringe for swabbing vaccination sight during hog cholera immunization. Patent pending. Price $10.61 F.O.B. Salem, S.D., Box 54. Additional wicks on request. Antiseptic of choice—Nordens Morgreen. Address Dr. L. R. McGregor, Salem, S.D.

(*Continued on p. 52*)

5 reasons why

Promptly combats
Pneumonia, Hemorrhagic Septicemia, Foot Rot

1. **Prompt therapeutic blood levels after parenteral administration.**
2. **Effective blood levels for 24 hours after a single intravenous dose.**
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4. **Optimum drug concentration for intravenous administration.**
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MERAMETH® *Sterile Solution* is administered by intravenous or intraperitoneal injection. It may be administered also by intramammary infusion for treatment of mastitis.

Supplied: No. 2324—250-cc. and 500-cc. rubber-capped bottles.

Dispensed only by or on the prescription of a veterinarian.

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MEDICAL FIELD OPERATING LAMPS, new portable, run on any current. Wilmot Castle and American Sterilizer. $25.00 FOB Orangeburg. Also nylon rope. Ask for catalog. Sailors Surplus. Orangeburg 19, N.Y.

Bloodlines, pedigrees, whelping, canine genetics—get Judy's 3rd ed. Principles of Dog Breeding, $4. Keep up on dogs through *Dog World* magazine, $3 one yr. (5 yrs. $10). Judy Publishing Co., 3323 Michigan Blvd., Chicago, Ill.

FOR SALE—Universal Field Master Portable X-ray, new, complete, only $465. Large sterilizers, electric, automatic, $30. Surgical Supply Service, 825 Walnut St., Philadelphia 7, Pa.

GIVE YOUR CAT PATIENTS A BREAK! Put *Cats* magazine on your waiting room table. It will help you, too, to keep up to date on what's happening to cats all over the United States and Canada. $5.50 for two years, $3.00 for one. CATS, 1144 House Bldg., Pittsburgh 22, Pa.

ARTIFICIAL INSEMINATION INSTRUMENTS —Standard and custom-made essential equipment and supplies. Sulfacitrate buffer tablets. Disposable plastic enseminating tubes, sterilized, $1.00 per package of twenty. Address Breeder's Equipment Co., Flourtown, Pa.

Dr. Fritz Volkmar, 1929 Irving Park Rd., Chicago 13, Ill., wishes to exchange his veterinary medical bookplate (*ex-libris*) with that of other veterinarians. Correspondence invited.

Received Too Late to Classify

WANTED VETERINARIAN—experienced in small animal practice. State full qualifications in first letter. Replies confidential. Dr. James E. Patterson, 3800 Grand River Ave., Detroit 8, Mich.

Young veterinarian, graduate of AVMA-approved school with seven years' experience in small animal practice and military service exempt desires responsible position with small animal hospital or with commercial enterprise. Highest references. Not afraid of hard work. Address "Box B 17," c/o JOURNAL of the AVMA.

Experienced, graduate veterinarian available for relief work while you are on your winter vacation. Licensed. Address "Box B 20," c/o JOURNAL of the AVMA.

Distributors or jobbers wanted for a well-established veterinary supply line in upper New York and New England. Veterinary acquaintance and commercial experience important. Address "Box B 21," c/o JOURNAL of the AVMA.

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For Effective control of Mastitis . . .

VETRICIN *

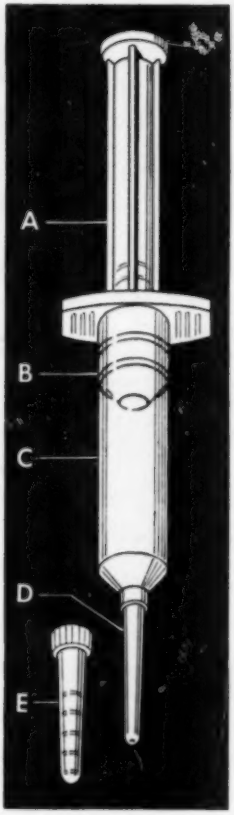
Vetricin's unique dispenser provides the graduate veterinarian an instrument possessing the following salient features:

1. A rigid barrel (c) which eliminates the possibility of expelling the medicant prior to the teat tube's entry into the teat orifice.

2. The plunger (a) action delivers the dose direct to the cistern through the streak canal, necessitating only a minimum of teat stripping or massaging.

3. The absence of sharp edges and the pliability of the teat tube (d) precludes any possibility of damage to the teat orifice or streak canal.

4. A superior dispensing instrument which is filled under aseptic conditions and which further retains sterility due to its three-point seal cap (e) and stopper (b).



Each VETRICIN dispenser of 5 c.c. contains 300,000 units of crystalline procaine penicillin-G and 100 mg. dihydrostreptomycin base as dihydrostreptomycin sulfate in a non-irritating peanut oil vehicle with 3% w/v aluminum-monostearate.

The action of the two antibiotics combined is much greater than the sum of their separate actions: VETRICIN'S suspension in a low viscosity and extremely fluid peanut oil insures maximum dispersion throughout the cistern area.

Kindly watch for the announcement of additional Imperial dispensing items which will be introduced in the near future.

Imperial

* Sales to Graduate Veterinarians Only.

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747 BARRIS DRIVE
FULLERTON, CALIFORNIA

1st Lieutenant Lloyd L. Burke
U.S. Army
Medal of Honor

THE RED KOREAN strongpoint had stalled our attack; Lieutenant Burke saw that a breakthrough must be made. Rallying 35 men, he crept close to the enemy bunkers. He laid down a grenade barrage. Then he ran forward to an exposed knoll and opened a one-man pitched battle. He turned a light machine gun into the Red position. He caught live enemy grenades in mid-air and threw them back. Once he killed three men with his pistol. Before sunset Lieutenant Burke and 35 men had defeated 300. The lieutenant says:

"Every day, men who fought in Korea are coming home. They're finding jobs—partly because they and you and I own nearly 50 billion dollars' worth of U.S. Defense Bonds. For Bond savings—which protect our families financially—are also building a great backlog of *national* prosperity. Reason enough for investing in Bonds—don't you agree?"

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Peace is for the strong! For peace and prosperity save with U.S. Defense Bonds!

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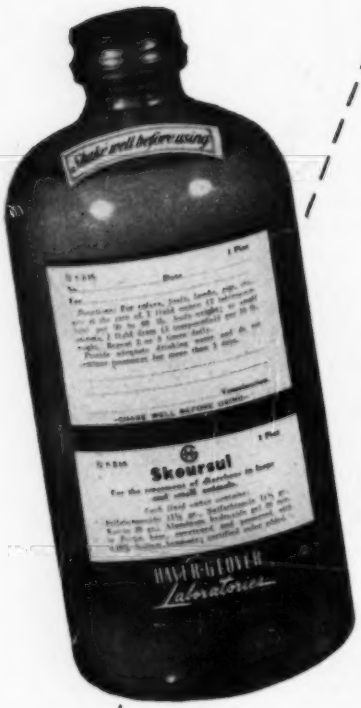

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FOR THE TREATMENT OF DIARRHEA IN LARGE AND SMALL ANIMALS

A smooth emulsion containing balanced amounts of Sulfabenzamide, Sulfathiazole, Kaolin, and Aluminum hydroxide gel in pectin base. Calf scours and diarrhea in foals, lambs, pigs, dogs and cats may be controlled with this well-known product. SKOURSUL may be administered by capsule, as a drench, or may be given with a spoon.

Supplied in: Pints, Gallons or Ctn. Doz. 8 oz. bottles.

Haver-Glover Laboratories

Kansas City, Missouri

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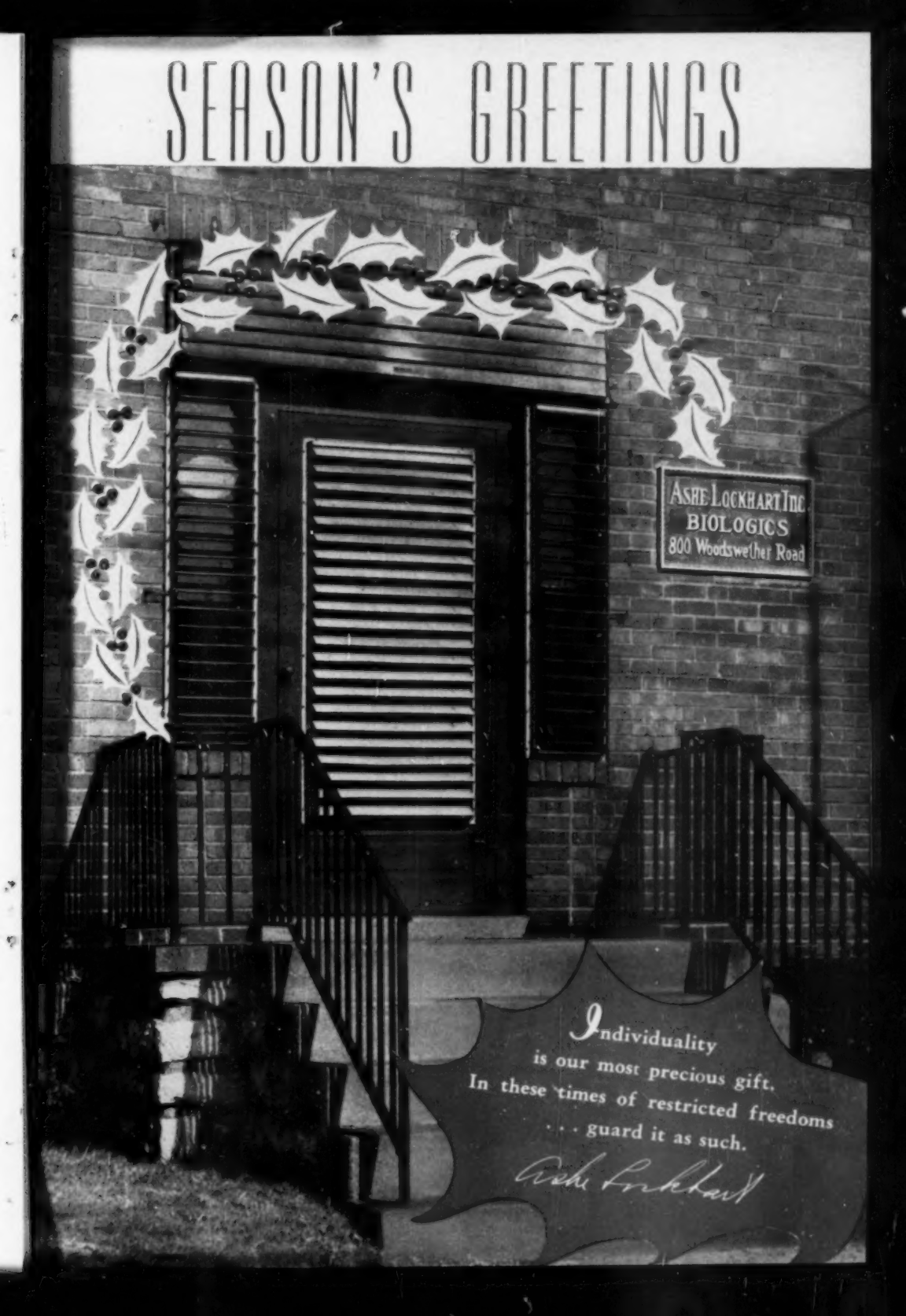
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Doctor, immunization with Jen-Sal antiserum will give your clients quick protection against loss from hemorrhagic septicemia and pulmonary edema of transit cattle and sheep.

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As companion product, use Jen-Sal Corynebacterium-Pasteurella Bacterin either two weeks prior to shipping or as a follow-up for the antiserum.

JEN-SAL C. P. ANTISERUM is supplied in 250 cc. vials (Code: COREP). JEN-SAL C.P. BACTERIN is supplied in 60 cc., 12 dose vials (Code: PULMO); and 250 cc., 50 dose vials (Code: PULBAC). Ample stocks available now from your Jen-Sal branch or distributor.

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